CDM Federal Programs Corporation

July 22, 1987

Hans Waetjen
Project Officer
U.S. Environmental Protection Agency
401 M Street, Room 2834
Washington, D.C. 20460

PROJECT: EPA CONTRACT NO.: 68-01-7331

DOCUMENT NO.: T162-R03-EP-AWLN-1

SUBJECT: Draft Report for Work Assignment 162
Philadelphia Coke Company, Inc.,
RCRA Facility Assessment
Preliminary Review/Visual Site Inspection

Dear Mr. Waetjen:

Please find enclosed the Draft Report entitled, "Philadelphia Coke Company, Inc., RCRA Facility Assessment, Preliminary Review/Visual Site Inspection," (document control no. T162-R03-DR-ANGT-4) as partial fulfillment of the reporting requirements for this work assignment.

If you have any comments regarding this submittal, please contact Jean R. Desruisseaux of PRC at (312) 938-1999 by July 31, 1987.

Sincerely,

CDM Federal Programs Corporation

Harry P. Butler
Deputy Program Manager

SAL:srw

Enclosure

cc: Eugene Dennis, EPA Primary Contact, RCRA Region III
Jeff Barnett, EPA Regional Contact, RCRA Region III
Lorraine Smith, EPA HQ Coordinator, RCRA Region III
Mark diFeliciantonio, CDM Federal Programs Corporation Regional Manager
Bruce Bakaysa (letter only)
Jean R. Desruisseaux, PRC, Project Manager (letter only)

TAK2 - 97

13135 Lee Jackson Memorial Highway, Suite 200 Fairfax VA 22033 703 968-0900

D

PRC Environmental Management, Inc.
Suite 500
303 East Wacker Drive
Chicago, IL 60601
312-856-8700
FAX# 938-0118

prc
Planning Research Corporation

January 25, 1988

Mr. Dana J. Barnett
U.S. EPA Region 3
841 Chestnut Street
Philadelphia, PA 19107

RE: TES III, Work Assignment 162
RCRA Facility Assessment for Philadelphia Coke

Dear Jeff:

I am writing this letter to confirm our discussion of the draft final RFA report for Philadelphia Coke on January 8, 1988. EPA accepts the draft final RFA report as final report, therefore, this draft final report constitutes the final deliverable for this work assignment. If you have any questions, please feel free to contact me.

Thank you for your assistance on this work assignment.

Sincerely,

Eddy S. Lin

cc: Harry Butler, CDM FPC
Mark deFeliciantonio, CDM FPC

T E S III

TECHNICAL ENFORCEMENT SUPPORT AT HAZARDOUS WASTE SITES

U.S. EPA CONTRACT NO. 68-01-7331

CDM Federal Programs Corporation

CDM Federal Programs Corporation

July 22, 1987

Hans Waetjen
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TAK2 - 97

DRAFT REPORT
PHILADELPHIA COKE COMPANY, INC.
RCRA FACILITY ASSESSMENT
PRELIMINARY REVIEW/VISUAL SITE INSPECTION

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

Work Assignment No.	:	162
EPA Region	:	III
Site No.	:	PAD000427906
Date Prepared	:	July 22, 1987
Contract No.	:	68-01-7331
CDM Federal Programs Corporation Document No.	:	T162-R03-DR-ANGT-4
Prepared By	:	PRC
Work Assignment Project Manager	:	Jean R. Desruisseaux
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This report presents the results of the preliminary review/visual site inspection (PR/VSI) of the Philadelphia Coke Company, Inc. (PCCI) facility in Philadelphia, Pennsylvania. The PR and VSI are part of the RCRA Facility Assessment being conducted by PRC Environmental Management, Inc. under contract No. 68-01-7331, Work Assignment No. 162. of the Philadelphia Coke Company, Inc.

PCCI operated this facility from January 1929 to May 17, 1982 to manufacture coke and coke by-products. Since 1982, there has been no production activity at the site. Since PCCI stopped operating the site, it has undertaken the following activities: (1) shipped all waste off-site for disposal; (2) started the demolition of the plant; and (3) implemented the steps to close the site which included the removal of contaminated soil, the installation and the sampling of monitoring wells, and the sampling of the soil. PCCI stopped demolition activities in mid-1985 and has not yet resumed them.

1.1 PURPOSE OF THE RCRA FACILITY ASSESSMENT

A RCRA Facility Assessment (RFA) is the first step in a process for implementing the corrective action provisions of the 1984 RCRA Hazardous and Solid Waste Amendments (HSWA). Specifically, Sections 3004(u), 3004(v), and 3008(h) grant U.S. EPA the authority to require corrective actions for releases of hazardous wastes and hazardous waste constituents from solid waste management units (SWMU) at RCRA facilities. An RFA generally includes three steps: preliminary review (PR), visual site inspection (VSI), and sampling visit (SV). The purpose of the RFA is to evaluate existing information on the facility to:

- Identify and gather information on releases of hazardous waste at the facility.
- Identify SWMUs and other areas of concern, and evaluate them for releases of hazardous waste.
- Determine the need for further actions and interim measures at the facility.
- Screen those SWMUs which do not pose a threat to human health or the environment from further investigation.

1.2 PRELIMINARY REVIEW PROCEDURES

PRC conducted this PR on the Philadelphia Coke Company, Inc. (PCCI) facility in accordance with the October 1986 RCRA Facility Assessment Guidance. PRC personnel reviewed information related to PCCI and interviewed persons familiar with this facility and its operations. The references at the end of this report list pertinent materials reviewed and persons interviewed.

To obtain information, PRC visited the U.S. EPA Region 3 office in Philadelphia on February 3, 1987, and the Pennsylvania Department of Environmental Resources (PADER) in Norristown on February 4 and 5, 1987.

1.3 VISUAL SITE INSPECTION PROCEDURES

On May 13, 1987, PRC and U.S. EPA conducted the VSI of PCCI in accordance with the procedure described in the October 1986 RFA Guidance. The purposes of this visit were to gather additional information and to visually inspect the site. The following persons participated in the VSI:

Jean R. Desruisseaux - PRC Environmental Management, Inc.
Greg Koltonuk - U.S. Environmental Protection Agency - Region 3
Ken McGill - U.S. Environmental Protection Agency - Region 3
Robert G. Gibson - Woodward-Clyde Consultants
James Hogeboom - Philadelphia Coke Company, Inc.

Upon arrival at the site, the inspectors introduced themselves, and explained the purposes of the visit to Mr. Hogeboom. Following the procedures described in the health and safety plan, the inspectors interviewed Mr. Hogeboom, gathered additional information, inspected areas where the SWMUs had been located, and took several photographs (see Appendix C).

1.4 PRELIMINARY REVIEW/VISUAL SITE INSPECTION REPORT

This report describes the facility and its operations (Section 2.0), the SWMUs and their conditions and operations (Section 3.0), releases from the SWMUs (Section

4.0), and the potential targets of the releases (Section 5.0). Section 6.0 summarizes the findings of the PR/VSI and presents recommendations for further actions.

2.0 FACILITY DESCRIPTION

2.1 GENERAL INFORMATION

PCCI is located on a 63-acre industrial-zoned site in Philadelphia (see Figure 1). It is bordered by Richmond, Orthodox, and Buckius Streets and by the Delaware River. This river is located about 200 feet east of the facility property. The site has an elevation of approximately 10 feet above mean sea level and is basically flat (PCCI, 1983b).

Other general information regarding the facility is listed below:

Facility Address:	Philadelphia Coke Company, Inc. 4501 Richmond Street Philadelphia, PA 19137
Telephone Number:	602/981-5443 215/535-7222
RCRA Contact:	James Hogeboom, Vice-President
Responsible Official:	James Hogeboom, Vice-President
Facility ID Number:	PAD 000 427 906
Type of Operation:	Storage
Notification for Operation of:	Surface Impoundment, Waste Pile

2.2 PROCESS DESCRIPTION AND WASTE GENERATION

PCCI operated the plant between 1929 and the early 1960's using both bituminous and anthracite coal to produce foundry coke and recover by-products such as benzene, toluene, and xylene, (PCCI, 1983b). Subsequently, until shutdown, PCCI produced only coke oven tar and coke oven gas. The manufacturing process involved feeding raw materials into a coke oven. Beside the principal product, namely coke, the process also yielded liquid and gaseous products. Approximately 25

percent of the coal volatilized as raw coke oven gas. The gas was cooled and passed through a cleaning system to remove residual tar, ammonia, naphthalene, sulfur, and cyanide. The coke gas cleaning system was the principal source of waste materials.[7] Mr. Hogeboom indicated that PCCI generated 360 tons of tar decanter waste annually.

This manufacturing process generated hazardous wastes such as tar decanter waste (K087), spent iron oxide, and ammonia sludges. During its operations, PCCI's plant accumulated an estimated 1,800 cubic yards of tar decanter waste and 2,800 cubic yards of spent iron oxide at the plant site.

2.3 PERMITTING STATUS

The following subsections discuss the RCRA and NPDES status of PCCI.

2.3.1 Resource Conservation and Recovery Act

On November 19, 1980, PCCI submitted a Part A permit application to store hazardous waste generated from its coking operations (PCCI, 1980). The application specified that a surface impoundment and waste pile would be used to store these wastes. U.S. EPA Region 3 granted interim status to PCCI (U.S. EPA, 1981) on July 24, 1981 and withdrew it on July 13, 1983. PCCI never submitted a Part B application.

2.3.2 National Pollutant Discharge Elimination System

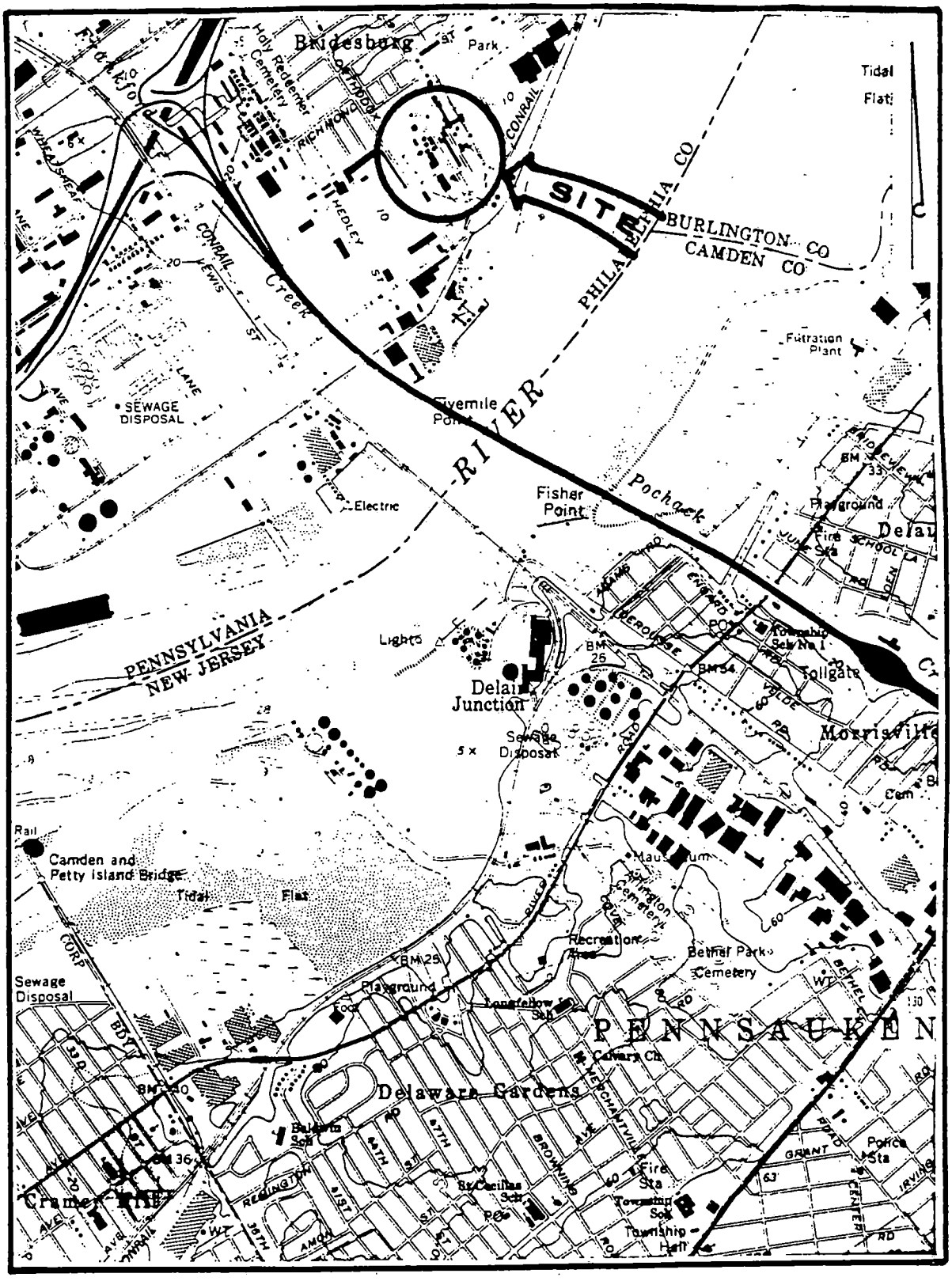
The only National Pollutant Discharge Elimination System (NPDES) permit issued to PCCI on file was dated August 9, 1974. PRC did not find any data pertaining to PCCI's compliance with the effluent limitation guidelines set by the permit.

2.4 SITE CONDITIONS

Peter R. Jacobson of Woodward-Clyde Consultants (WCC) indicated that PCCI lies above the Delaware River's 100-year floodplain and receives an average of 45

Figure 1

Regional Location Plan



Source: Hydrogeologic and Soils Investigation, Woodward-Clyde Consultants

inches of precipitation annually. The prevailing wind direction at the facility is from southwest.

WCC, a contractor to PCCI, conducted a hydrogeologic investigation of the site. The report was submitted to PADER on behalf of PCCI on July 16, 1985. The report discussed the hydrogeologic conditions of the site, described the installation of six monitoring wells, and presented analytical results of ground-water samples taken on April 9, 1985.

2.4.1 Geologic Conditions

The PCCI facility lies along the westernmost margin of the Atlantic Coastal Plain Physiographic Province (Figure 2). Topographically, a relatively undiversified lowland characterizes the Coastal Plain region. Geographically, the Coastal Plain of southeastern Pennsylvania is underlain by a wedge of unconsolidated sediments which thicken in a southeasterly direction. The unconsolidated sediments are in turn underlain by crystalline bedrock. The Coastal Plain deposits are composed of gravels, sands, silts, and clays ranging in age from Early Cretaceous to recent. This wedge of Coastal Plain sediments range in thickness from a thin film at the edge of the fall line to over 6,000 feet beneath the mouth of Delaware River (WCC, 1987).

A sequence of sand and fill materials underlain by a geologically recent silty clay alluvium layer, a lower sand and gravel deposit of questionable age, and an Early Paleozoic Crystalline bedrock characterizes the facility subsurface (WCC, 1987).

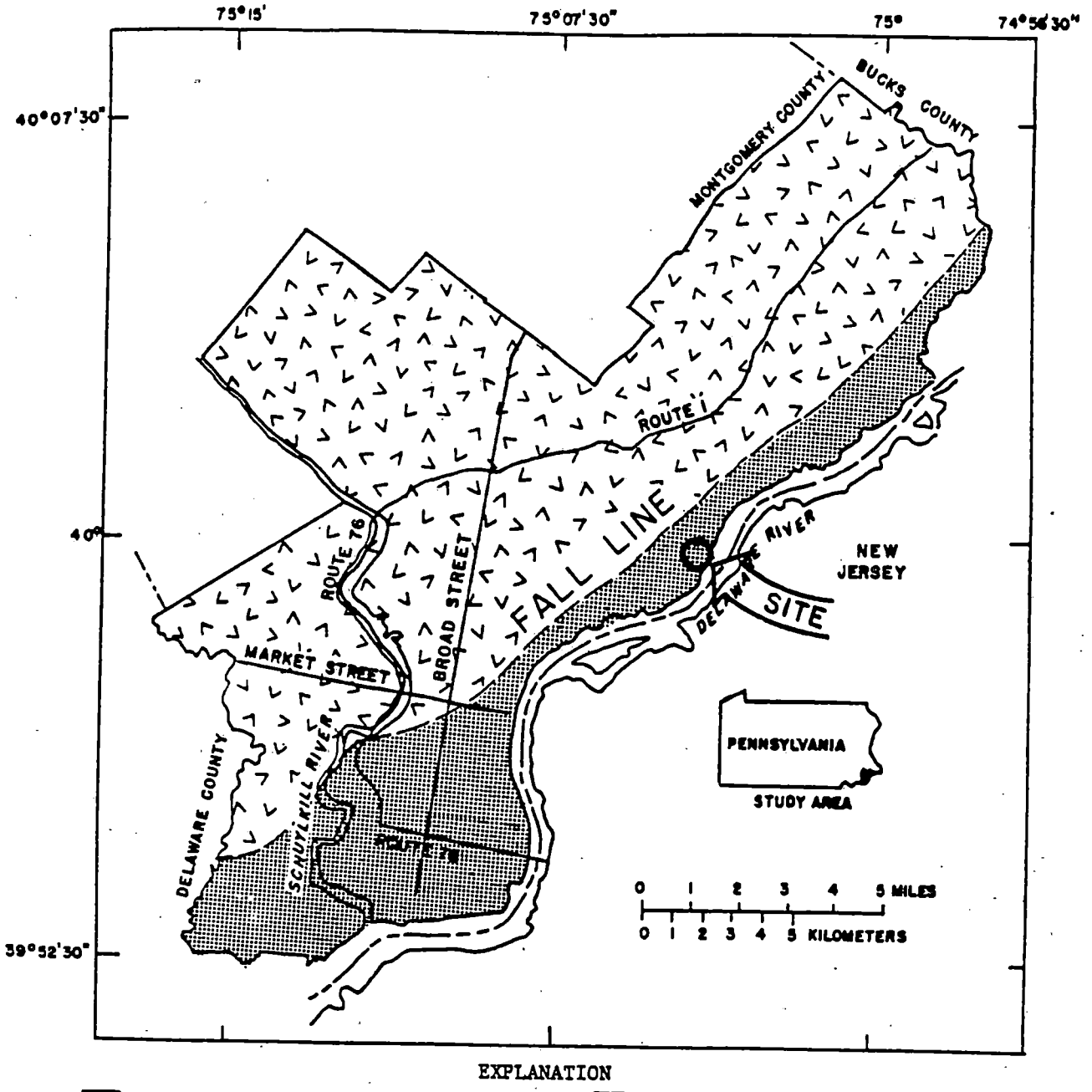
2.4.2 Ground-Water Monitoring System

At the request of PADER, PCCI installed four monitoring wells to investigate the subsurface conditions and the ground-water quality at the site during the week of March 25, 1985. These monitoring wells are identified as W-1, W-2, W-3, and W-4.

The monitoring wells were constructed of 4-inch inside diameter PVC pipe with a 10-foot screen length. A well cap placed on the bottom of the screen prevents

Figure 2

Generalized Geology of Philadelphia County



EXPLANATION

PIEDMONT
Underlain by crystalline rocks, chiefly schist of the Wissahickon Formation, lesser amounts of quartzite of the Chickies Formation, and gneissose rocks of granitic to gabbroic composition

COASTAL PLAIN
Underlain by unconsolidated deposits of gravel, sand, silt, and clay. Includes Potomac-Raritan-Magothy aquifer system.

GENERALIZED GEOLOGY, PHILADELPHIA COUNTY
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

the well from settling into the sediment. Nevertheless, sediment may infiltrate the screen. However, the well cap helps elevate the screen so it does not directly set in the sediment and fill it entirely. The annulus around each well screen, and 1 to 2 feet above and below the screen, is filled with a sand pack. The well is sealed with approximately 1 foot of bentonite pellets placed above the sand pack. A cement grout lies over the bentonite up to the surface. Finally, a 6-inch diametersteel locking pipe placed into the cement grout around the PVC riser pipe protects the well (WCC, 1985b). WCC sampled these wells on a quarterly basis and submitted the analytical results from April 1985 to October 1986 to PADER on behalf of PCCI. The samples were analyzed for water quality parameters, volatile organics, acid extractables, and base/neutral extractables (Appendix A).

During the week of October 15, 1986, PCCI installed two more monitoring wells designated as W-5 and W-6. These new monitoring wells differ from the previously installed wells only in that they have a 2-inch inside diameter instead of 4-inch diameter. Figure 3 shows the locations of all six monitoring wells and Table 1 presents pertinent information regarding them. The monitoring well logs are presented in Appendix B. Currently, WCC samples only wells W-1 through W-4 and submits analytical results on a quarterly basis to PADER (Hogeboom, 1987).

2.4.3 Ground-Water Flow Conditions

Figure 4 presents a map showing regional ground-water flow. WCC reported on July 16, 1985 that the ground water at the site flows radially outward from a central high located at monitoring well W-2. The remaining three wells, W-1, W-3, and W-4, are located peripherally to W-2. The hydraulic gradient between wells W-2 and W-4 is relatively steep, approximately 1 foot of head change per 107 feet horizontal distance. The gradients between wells W-2 and W-1 and between W-2 and W-3 are shallower, approximately 1 foot per 300 feet and 1 foot per 500 feet, respectively.

As of August 27, 1986, WCC was unsure which wells should be regarded as upgradient. Although the water level was found to be highest in well W-2 and lowest in W-4 (which would suggest that W-2 is upgradient and W-4 is downgradient), the quality of ground water in well W-2 suggests that W-2 is downgradient. To better understand this matter, WCC proposed to install one or

Figure 3

Monitoring Well Location Map

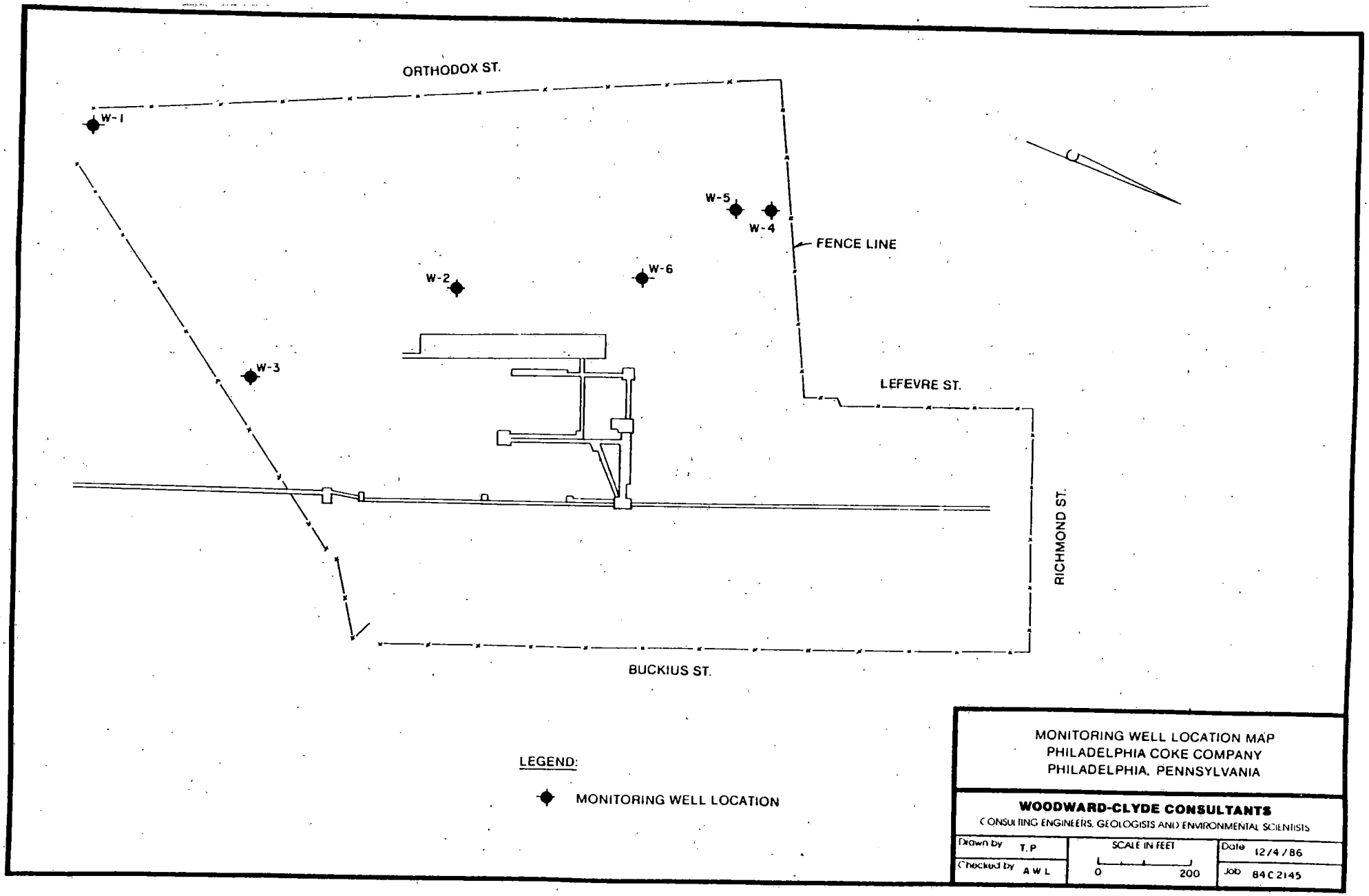


Table 1

SUMMARY OF WELL CONSTRUCTION DATA
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Well Number	Completion Date	Total Depth (1) (ft)	Casing Material	Casing Diameter (in)	Type of Screen	Screened Interval (1) (ft)	Top of Casing Elevation (ft) (2)	Ground Elevation (ft) (2)	Coordinates (3)	
									North	East
W-1	March 25, 1985	14	PVC	4"	SCH 40 20 SLOT	3-13	10.94	8.7	8,499.01	9,559.42
W-2	March 26, 1985	14	PVC	4"	SCH 40 20 SLOT	3-13	15.31	13.4	9,242.25	9,932.47
W-3	March 26, 1985	14	PVC	4"	SCH 40 20 SLOT	2.5-12.5	14.46	11.5	8,832.18	10,256.92
W-4	March 25, 1985	16	PVC	4"	SCH 40 20 SLOT	4-14	15.17	13.2	9,978.68	9,713.30
W-5	October 23, 1986	16	PVC	2"	SCH 40 10 SLOT	4-14	14.76	12.80	9,886.25	9,729.98
W-6	October 23, 1986	14	PVC	2"	SCH 40 10 SLOT	4-14	14.50	12.90	9,669.25	9,914.97

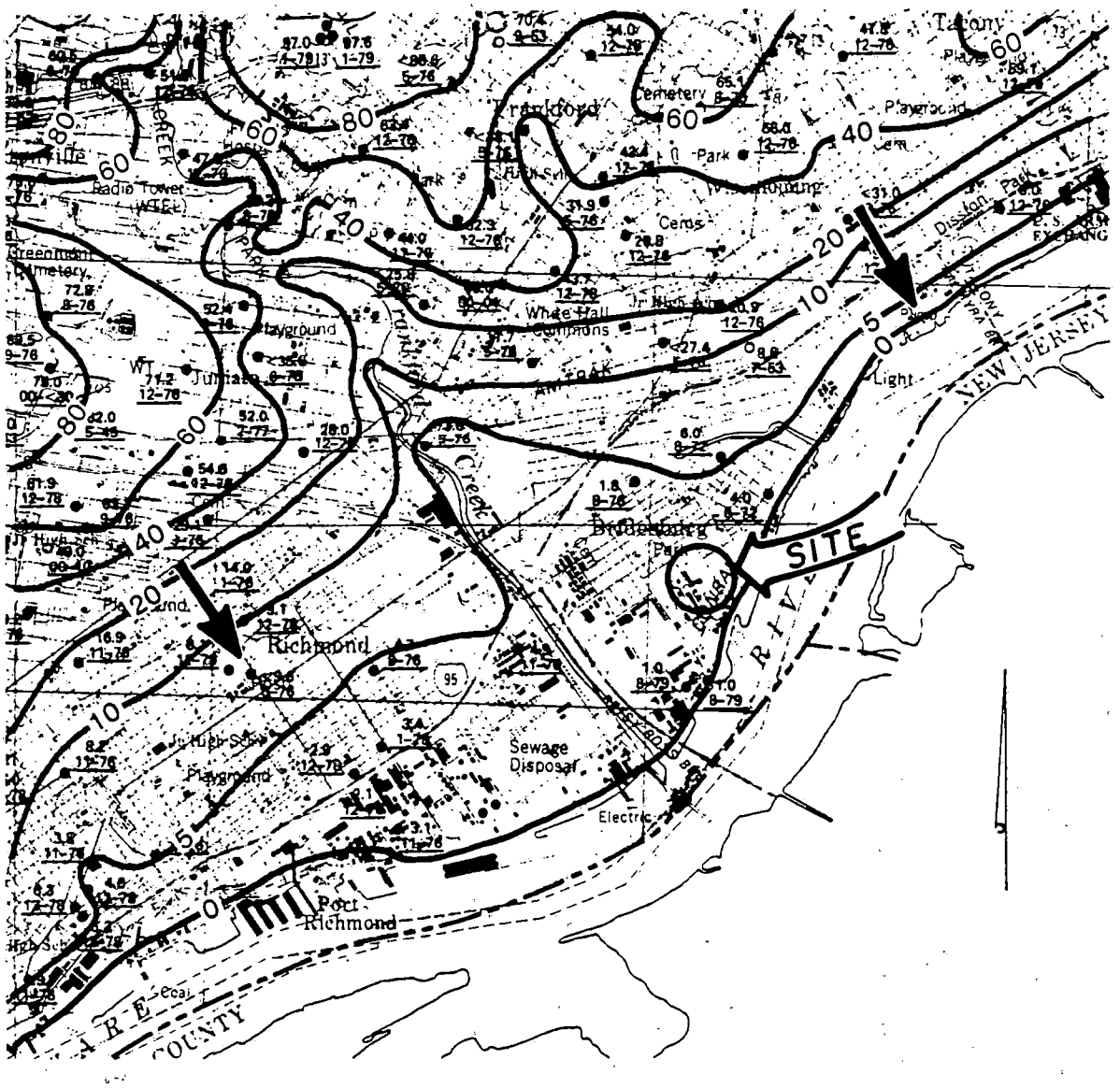
(1) Screened intervals and depths are in feet below ground surface

(2) Elevations in feet Mean Sea Level (USGS Datum)

(3) Plant coordinate system

Figure 4

Regional Ground-Water Flow



NOTE: GROUNDWATER ELEVATION CONTOURS ARE SHOWN AS U.S.G.S. DATUM ELEVATIONS.

FROM: PAVACHOK, G.N. AND WOOD, C.R., 1984 WATER TABLE MAP OF PHILADELPHIA, PENNSYLVANIA, 1976-1980.

REGIONAL GROUNDWATER FLOW
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

two observation wells to establish gradients on an areawide basis. Two wells (W-5 and W-6), as mentioned earlier, were installed during the week of October 15, 1986 (see Figure 3).

The Delaware River displays a tidal range in excess of 6 feet in the vicinity of PCCI. No measurable change in ground-water levels at the facility was observed in response to tidal fluctuations.

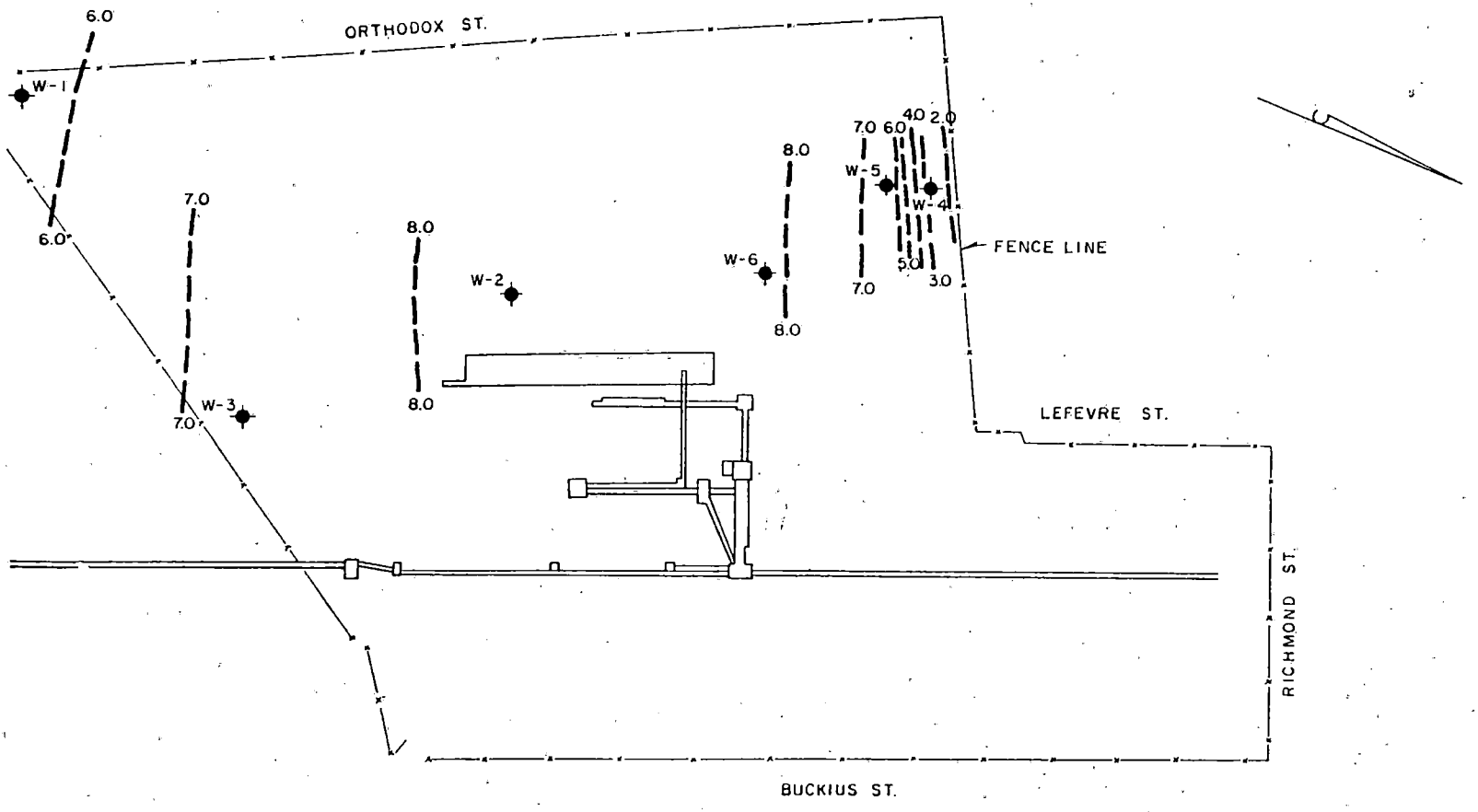
No analytical results were available on wells W-5 and W-6 at the time of the PR/VSI. However, after installing wells W-5 and W-6, WCC collected new ground-water elevation data and concluded that its original deduction that a steep hydraulic gradient exists between W-2 and W-4 was incorrect. WCC found that an essentially flat hydraulic gradient exists between wells W-2 and W-6 and an extremely steep hydraulic gradient exists between wells W-5 and W-4. Based on this ground-water pattern, WCC suggested the possible existence of a localized hydrologic sink controlling flow in the vicinity of W-4. WCC reviewed plant utilities data which reveal that a 12-foot, 3-inch diameter industrial city sewer (about 30 feet below grade) traverses the plant within 30 feet east of W-4. WCC considered it to be the probable ground-water sink. According to WCC, W-4 can be considered hydraulically upgradient of the plant because it is likely to be upgradient of the sink area even though it has the lowest ground-water level at the site (see Figures 5 and 6).

2.4.4 Surface Water Conditions

The Delaware River is located 200 feet west of the site. There is no other surface water body in the vicinity of the site or at the site. Also, Mr. Hogeboom indicated that all surface runoff as well as all sanitary and industrial (from the waste liquor pit) wastewaters went to the city of Philadelphia sanitary sewer system. During closure activities, PCCI blocked every man-hole located at the site and blocked the site sewer system to keep it from discharging to the city of Philadelphia sanitary sewer system. Currently, surface water runs off toward the river through natural drainage.

Figure 5

Ground-Water Elevations



LEGEND:

MONITORING WELL

8.0 GROUNDWATER CONTOUR

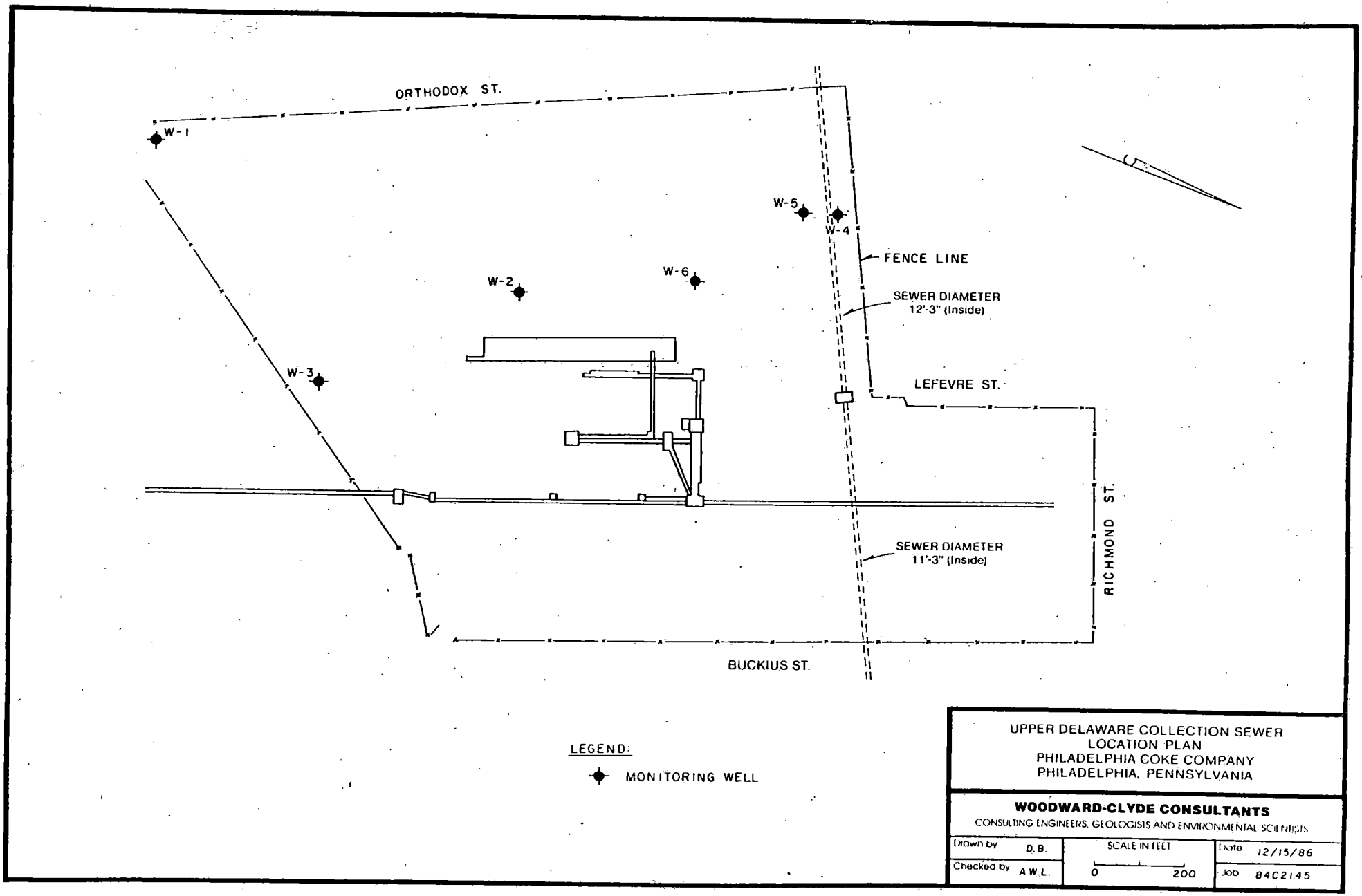
GROUNDWATER ELEVATIONS, OCT. 27, 1986
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn By	T. P.	SCALE IN FEET	Date 12/8/86
Checked	T.W.T.	0 200	Job 84C2145

Figure 6

Upper Delaware Collection Sewer Location



3.0 SOLID WASTE MANAGEMENT UNITS

PCCI operated nine solid waste management units (SWMU) from 1929 to May 17, 1982 to manage hazardous waste generated at the plant. Subsequently, most of the wastes on-site were removed off-site for disposal. Sara Ginzler of PADER indicated that all land-based SWMUs were emptied, partially cleaned, then backfilled with clean soil. Figure 7 shows the locations of these SWMUs. Table 2 lists all waste present at the site when PCCI stopped production operation on May 12, 1982. The following sections describe the characteristics of the SWMUs at the site.

3.1 SURFACE IMPOUNDMENTS

Three surface impoundments (SI) connected in series were located southwest of the coke oven battery. These SIs, also called the decanter tar bottoms area, had a total capacity of 40,000 gallons and covered a total surface area of 1,365 square feet. Two of the SIs were concrete-lined, and were each connected to a tar decanter; the third SI had an earthen bottom. PCCI used them to store tar decanter waste (PCCI, 1983b).

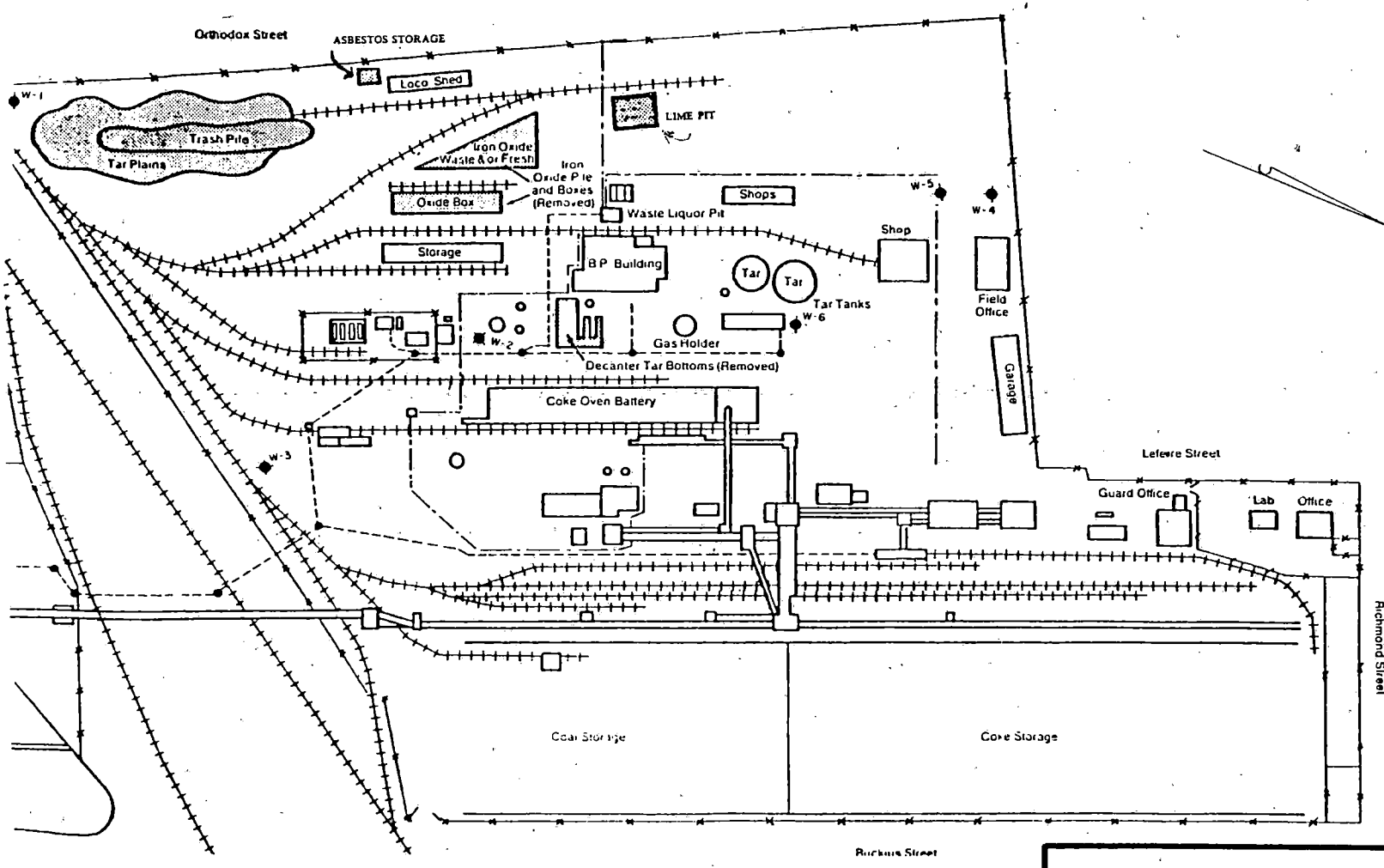
PCCI cleaned these SWMUs twice a year by bucketing the sludge into railroad cars. This sludge was transported to the tar plains (Hogeboom, 1987). When PCCI ceased to operate on May 12, 1982, the three surface impoundments contained approximately 1,800 cubic yards of tar decanter sludge. On December 28, 1982, PCCI notified PADER that the surface impoundments were emptied and their contents shipped to a Browning-Ferris Industries (BFI) secure landfill, the Solley Road Landfill (SRL) located in Glen Burnie, Maryland (PCCI, 1982). Subsequently, these SWMUs were reportedly backfilled with clean soil.

Observations of VSI

The inspectors observed that all three SI were capped. The area is sparsely covered with grass (see Photos No. 1 and 2 in Appendix D).

Figure 7

Facilities Location Plan



PLANT FACILITIES LOCATION PLAN
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn By	T.P.	SCALE IN FEET	Date	12/5/86
Checked	A.W.L.	0 100 200	Job	84C2145

Table 2

Inventory of Solid and Hazardous Wastes

Storage Area	Description	Waste	Waste Classification Contaminants	Estimated Quantity	Basic Closure Strategy
1. Tar storage tanks	2- steel tanks: 1- 1,000,000 gal 1- 500,000 gal	Decanter tar sludge	K087 - phenol; naphthalene	650 cu yd	• Remove wastes. • Decontaminate and salvage tanks.
2. Waste liquor pit	25 ft x 25 ft x 10 ft concrete pit	Ammonia sludges; tar sludge	Phenol; naphthalene; cyanide; ammonia.	275 cu yd	• Remove waste. • Decontaminate and place clean fill in pit.
3. Trash pile	Piles of residual materials several feet high over an approximate 50 ft x 250 ft area.	Cleanup tar waste, coal fines, wood, rubble, steel, and other debris	Debris and rubble; generally inert	2,000 cu yd	• Analysis indicates nonhazardous (5/5/83 analytical report). • Segregate nonhazardous debris from tar plains. • Remove wastes.
4. Tar plains	A layer several feet thick of tar mixed with coal fines and soil over an approximate 50 ft x 300 ft area.	Decanter tar waste	K087; coal fines and coke, debris and rubble	2,200 cu yd	• Excavate and remove tar. • Segregate nonhazardous debris from hazardous waste. • Backfill excavations. • Cover excavated areas.
5. Clean oxide	Uncontaminated, unused iron oxide	---	---	2,000 cu yd	• Blend with acceptable nonhazardous debris for on-site disposal.
6. Wood trays	Wood debris	---	---	300 cu yd	• Disposal as fuel off-site.
7. Tar decanters	1,800 cu yd of tar decanter waste have been removed; the area has been backfilled.	---	---	---	• Inspect surrounding soils.
8. Iron oxide boxes and pile	2,700 cu yd of spent iron oxide have been removed; the area has been covered.	---	---	---	• Inspect surrounding soils.
9. Process piping throughout site	Asbestos insulation	Asbestos	Asbestos (not regulated as a hazardous waste)	100-150 cu yd	• Removal by trained contractor. • Disposal at authorized site.

10. Prior to demolition, all process and residual piping were steam-cleaned for an extended period, with all residues collected and disposed. No underground piping was used on the site. Remaining process chemicals, including sulfuric acid, have been sold to other firms.

[1]See Figure 3-1, Waste Processing Material Balance Flow Sheet.

3.2 WASTE LIQUOR PIT

The waste liquor pit was located southwest of the main building (designated as B.P. Building on Figure 7). This concrete pit had a capacity of 6,250 cubic feet. PCCI operated this SWMU to store waste ammonia liquor, still bottoms from by-products plant, and spillage and wash down water collected in floor drains. These wastes continuously flowed into and out of the pit. Effluent from the pit went to Northeast Sewage Treatment Plant located 3/4 mile north of PCCI.

While in operation, PCCI cleaned this SWMU every year and bucketed the sludge to the tar plains. The contents of this unit was hazardous because of the presence of phenol, naphthalene, cyanide, and ammonia. At closure, PCCI sent all remaining sludge to SRL.

Observations of VSI

The inspectors observed that soil that was put into the pit supports some vegetation. Also, the wall of the pit was noticed to be discolored (black) by past operation (see Photo No. 3 in Appendix D).

3.3 IRON OXIDE PILE

This unit was located south of the main building and covered an area of 60,000 square feet. PCCI operated this unit consisting of an uncovered asphalt pad to store spent iron oxide from the gas cleaning process. This waste was potentially hazardous because of its cyanide and phenol content. Mr. Hogeboom indicated that while in operation, PCCI removed the iron oxide from the pile by means of buckets and transported it to the tar plains every eighteen months. This waste pile storage area had a capacity of 2,000 cubic yards. Figure 7 identifies this general area as iron oxide pile and boxes (removed) (PCCI, 1983b). At closure, the spent iron oxide was removed and shipped off-site concurrently with the tar decanter waste (PCCI, 1982).

Observations of VSI

The inspectors did not notice any waste in this area. Photo No. 4 in Appendix D shows this area.

3.4 TAR PLAINS

The tar plains were located south of the iron oxide boxes and pile along the railroad track (Figure 7). This unlined SWMU, which occupied an area of approximately 15,000 square feet, was used to store oil mixed with tar, coal fines and coke, debris, rubble, and sludge from the three surface impoundments directly on the ground. PCCI used buckets to load the sludge into railroad cars which transport the sludge to the tar plains. An estimated 2,200 cubic yards of waste was reportedly stored in this unit at closure (PCCI, 1983b). During closure, clean tar and scrap coal were shipped off-site to a cement plant whose name Mr. Hogeboom does not remember. Dirty tar and contaminated soil were disposed of at Kelly Run Sanitation, Pittsburgh, Pennsylvania and at SRL. That was the only time the tar plains were ever cleaned up. PCCI has not backfilled the tar plains.

Observations of VSI

During the VSI, the tar plains area was observed to be covered with water (see Photo No. 5 in Appendix D). The inspectors did not notice any means to drain this water off-site.

3.5 TAR STORAGE TANKS

PCCI operated two steel tanks located northwest of the coke oven battery. These tanks had capacities of 1,000,000 and 500,000 gallons, respectively. PCCI operated these tanks from 1929 until closure to store coke oven tar. While in operation, PCCI cleaned these tanks every four to five years since only a small quantity of sludge was generated. To clean the tanks, PCCI entered the tanks and scooped the sludge out manually. PCCI stored the sludge, which was hazardous because of its phenol and naphthalene contents, in the tar plains area (Hogeboom, 1987).

When PCCI stopped operating, these tanks contained a total of 131,298 gallons of tar decanter sludge (Table 2). Clean Venture, a contractor to PCCI, mixed spent iron oxide and the tar decanter sludge in a ratio of approximately 3:1 and shipped the mixture to SRL. The tanks were cleaned, dismantled, and sold as scrap material (PCCI, 1982).

Observations of VSI

During the VSI, only the concrete bases on which the tanks were mounted remained at the site. Photos No. 6 and 7 in Appendix D show these bases.

3.6 LIME PIT AREA

The lime pit was located northwest of the iron oxide pile. The pit covered an area of 5,000 square feet and was about 6 feet deep. PCCI operated this unit to neutralize sulfuric acid with lime. When PCCI stopped operating the plant, it did not remove the material from the pit. PCCI simply covered the pit with soil (Hogeboom, 1987).

Observations of VSI

The lime pit area supports some of the healthiest vegetation at the site. Photo No. 8 in Appendix D shows this area.

3.7 ASBESTOS STORAGE AREA

This SWMU occupied an area of 800 square feet and was located west of the tar plains, along Orthodox Street. While PCCI was in operation, process piping throughout the site was insulated with asbestos. Also, PCCI used asbestos while repairing the coke oven to protect workers from heat (Hogeboom, 1987). When PCCI stopped its operations, an estimated 100 to 150 cubic yards of asbestos was stored on-site. PCCI contracted the removal and disposal of the asbestos to East Coast Salvage located in Camden, New Jersey.

Observations of VSI

The storage area was observed to be dismantled. Photo No. 9 in Appendix D shows that only a concrete floor is left of the storage area.

3.8 TRASH PILE

The trash pile was located on the tar plains area. This pile covered an approximate area of 12,500 square feet. PCCI operated this waste pile to store wastes such as cleanup tar waste, coal fines, wood, some spent iron oxide, rubble, steel, and other debris. When PCCI stopped operating the site, 2,000 cubic yards of waste was stored at the site. At closure, PCCI separated noncontaminated material from contaminated material. Noncontaminated material was sent to Boyertown Landfill, Pennsylvania; tar decanter contaminated waste was mixed with spent iron oxide and shipped to SRL and Kelley Run. That was the only time PCCI removed waste from the trash pile.

Observations of VSI

The inspectors observed the trash pile to be covered with water. No vegetation was present at this SWMU. Photo No. 10 in Appendix D shows the trash pile area.

3.9 WASTEWATER TREATMENT SYSTEM

This SWMU consisted of a cooling tower and an oil/water separator. While in operation, PCCI utilized water out of the Delaware River for cooling purposes. During this process, the water warmed up and became contaminated with oil. Before discharging this water back to the river, PCCI used to cool it down through a cooling tower and clean it in an oil/water separator. Since 1982, the cooling tower was dismantled and the oil/water separator was left at the site.

Observations of VSI

The inspectors observed that the oil/water separator, the only unit left of the wastewater treatment system, was partially filled with soil and supports some vegetation. This unit is shown in Photo No. 11 in Appendix D.

4.0 KNOWN AND SUSPECTED RELEASES

PCCI operated this plant for 53 years. During that time, several soil and surface-water releases occurred.

No data was available on air releases in EPA and state files. PCCI waited until April 1985 to install a ground-water monitoring system and gather ground-water data. However, this monitoring system does not allow a comprehensive assessment of the impact of PCCI's operation on ground-water quality since it does not monitor units such as the waste liquor pit or the lime pit.

Following the cleanup of the site, PCCI contracted WCC to sample and analyze the soil at the site. A total of 22 priority pollutants were detected. The following sections address releases to ground water, surface water, soil, and air. Throughout these sections, the expression "acceptable concentration" is used. This expression refers to guidelines gathered from the following sources by WCC : Ambient Water Quality Criteria, Organoleptic Ambient Water Criteria, Suggested No Adverse Response Level, Recommended Maximum Contaminant Level, and Maximum Contaminant Level. Table 3 presents the parameters, the acceptable concentration, and the guideline basis for this section.

4.1 GROUND-WATER RELEASES

Although the site began operations in 1929, it was only in 1985, 3 years after PCCI stopped all operations, that four ground-water monitoring wells were installed at the site. PCCI installed these wells at the request of PADER to investigate the impact of the management of hazardous waste on the ground-water quality at the site. As part of the site closure procedures, WCC submitted ground-water analytical results to PADER on behalf of PCCI. Appendix A presents ground-water analytical results from April 1985 to October 10, 1986. The results are for general

Table 3

PRIORITY POLLUTANT WATER QUALITY CRITERIA
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Parameter	Acceptable Concentration (ppb)	Guideline Basis
Acid Extractables		
Phenol	3500	Ambient Water Quality Criteria
2,4-Dimethylphenol	400	Organoleptic Ambient Water Criteria
Base/Neutral Extractables		
Naphthalene	No standard	
Acenapthylene	2.8×10^{-2}*	
Acenapthene	2.8×10^{-2}*	Ambient Water Quality Criteria
Fluorene	2.8×10^{-2}*	Ambient Water Quality Criteria
Phenanthrene	2.8×10^{-2}*	Ambient Water Quality Criteria
Benzo(a)pyrene	2.8×10^{-2}*	Ambient Water Quality Criteria
Benzo(a)anthracene	2.8×10^{-2}*	Ambient Water Quality Criteria
Pyrene	2.8×10^{-2}*	Ambient Water Quality Criteria
Fluoranthene	42	Ambient Water Quality Criteria
Bis (2-Chloroethyl)ether	0.3*	Ambient Water Quality Criteria
Hexachloroethane	19*	Ambient Water Quality Criteria
Nitrobenzene	19,800	Ambient Water Quality Criteria
2-6, Dinitrotoluene	No standard	
Bis (2-Chloroethoxy)methane	No standard	
Bis (2-Ethylhexyl)phthalate	4200	Suggested No Adverse Response Level
Volatile Organics		
Methylene Chloride	50*	Ambient Water Quality Criteria
Benzene	5	Maximum Contaminant Level
Toluene	2000	Recommended Maximum Contaminant Level
Ethylbenzene	680	Recommended Maximum Contaminant Level

* For an incremental increased lifetime cancer risk of 10^{-5}.

ground-water quality parameters and priority pollutant parameters. These results are summarized below and compare background water quality for water quality parameters. The results are also compared with background water quality and acceptable concentrations based on ambient water quality criteria for priority pollutant parameters. All priority pollutant parameters found from the analyses of ground-water samples were also found in soil samples; specially soil samples taken in the vicinity of the surface impoundments (Section 4.3). Also, although some spills are documented (Section 4.2), it is quite conceivable that other spills may have not been reported. Such spills represent a potential source of ground-water contamination and may be at the origin of many parameters found in the ground-water beneath the site.

Water Quality Parameters

WCC started the sampling program with 33 parameters. During the first two sampling rounds, 11 parameters were not detected and, with the approval of PADER, WCC removed them from the list. (The analytical results for these 11 parameters are not provided in Appendix A).

Comparison of parameters detected in ground-water samples from well W-2 and to a lesser extent from wells W-1 an W-3, with samples from W-4 (considered background by WCC) suggests that ground water beneath the site has been contaminated by operations at the site. The parameters with the highest concentrations are:

Parameters	W-1 (mg/L)	W-2 (mg/L)
Chloride	416.0	1990.0
Fluoride	2.6	5.6
Iron, dissolved	49.0	36.8
Manganese, dissolved	12.0	11.4
Sulfate	1,675	3,650
Total dissolved solid	4,094	11,100

Samples from wells W-3 and W-4 show high concentrations for TDS, sulfate, and iron, but these concentrations were lower than those from W-2 and W-1.

Volatile Organics

The analytical results for volatile organics revealed the presence of benzene, methylene chloride, toluene, and ethylbenzene. Of these parameters, only methylene chloride is present in well W-4 (considered to be upgradient) at a concentration lower than those found in both wells W-2 and W-3, but higher than that of well W-1 during the first sampling round. Samples from monitoring wells W-1 and W-2 show the highest concentrations for the remaining contaminants. Benzene concentrations in all W-2 samples range from 0 to 490 ppb, which is up to 98 times above the acceptable concentration (see Table 3).

Acid Extractables

The analytical results for acid extractable compounds revealed that phenol and 2,4-dimethylphenol are found in the ground water at the site. These compounds were found only in monitoring well W-2; none was found in well W-4 (upgradient). Phenol concentration was below the acceptable concentration, but that of 2,4-dimethylphenol (27,600 ppb) was 6.9 times higher than the acceptable concentration (see Table 3).

Base/Neutral Extractables

The analytical results for base/neutral extractables show that a total of 15 base/neutral extractable priority pollutants are present in the ground water at the site. Again, wells W-1 and W-2 were the only wells showing ground-water contamination with these compounds. Six of these compounds were found in W-1 in low to moderate concentrations; W-2 revealed the presence of 14 of the compounds. However, the first sampling round showed a higher concentration for bis(2-ethylhexyl) phthalate in well W-4 (8.5 ppb) than in well W-2 (<5 ppb). All concentrations in well W-2, except those for nitrobenzene (90,000 ppb) and bis(2-ethylhexyl)phthalate (<5.0 ppb), were above acceptable concentrations. No base/neutral extractables were found in well W-4 (upgradient) (see Table 3).

4.2 SURFACE-WATER RELEASES

PCCI has exceeded its NPDES permit limitations on many occasions and several spills have occurred; therefore, it is likely that PCCI has contaminated the Delaware River, which is located 200 feet east of the site. Some of the discharges and spills occurring over the years and reported in PADER's "Facility Inspection Checklist" are listed below:

Discharges

Date	Material
July 2, 1970	Water containing cyanide and phenol
February 5, 1971	Water containing cyanide and phenol
April 7, 1971	Water containing cyanide
December 21, 1973	Water containing oil
March 24, 1975	Water containing cyanide and phenol
May 23, 1978	Water containing cyanide and ammonia-nitrogen

Spills

Late 1980	Fuel oil
January 14, 1982	Oil
Unknown	Tar, naphthalene
March 29, 1982	Quench water

Also, as discussed in Section 4.3 below, the soil at the site is still contaminated. Therefore, the Delaware River may still be receiving contamination through surface water run-off. Furthermore, it appears that the contaminated ground water beneath the site may discharge to the Delaware River (WCC, 1987).

4.3 SOIL RELEASES

To evaluate the effectiveness of site cleanup performed during closure activities, PCCI initiated a soil sampling program in October 1986. PCCI contracted the sampling to WCC and the analysis to Compuchem Laboratories, Inc. Soil samples were collected from the following locations: the tar decanter bottoms area, the tar plains, the lime pit, and the waste liquor pit. In addition, WCC collected a

background soil sample to compare the analytical results and assess the effectiveness of the cleanup. Soil sampling activities may be summarized as follows (WCC, 1987):

- Figure 8 shows the locations of the thirteen soil borings to sample the soil
- Table 4 describes the location of the samples, the approximate depth of the samples, the number of samples, and the sampling method.
- Table 5 presents the soil quality results for 22 priority pollutants.
- Figure 9 shows that more than one soil sample were taken at some borings and helps to better picture the locations of the samples presented in Table 5.
- Appendix C presents boring logs for nine test borings (B-1 through B-9).

The following sections discuss the locations that were investigated for possible soil contamination.

Tar Decanter Bottoms Area

WCC sampled the soil in the surface impoundment with the earthen bottom and observed evidence of contamination, such as elevated organic vapor readings, strong odors, and visible staining of fill materials. Evidence of contamination was less obvious outside the surface impoundment. During sampling activities at the two concrete-lined surface impoundments, WCC also observed an oily sheen on the soils and a viscous, black, tar-like material present at an 11-foot depth (boring B-5). Robert G. Gibson of WCC indicated that no concrete was encountered. This suggests that borings were outside the concrete-lined surface impoundment. Analytical results for the tar decanter bottoms area reveal the presence of 21 priority pollutants. Various points in the area contain significant soil contaminant concentrations. Inside the earthen bottom surface impoundment the total concentration of base/neutral extractable organics is 568,100 ppb, and around the concrete-lined surface impoundment it is 2,229,200 ppb (see Table 5).

Figure 8

Soil Sampling Locations

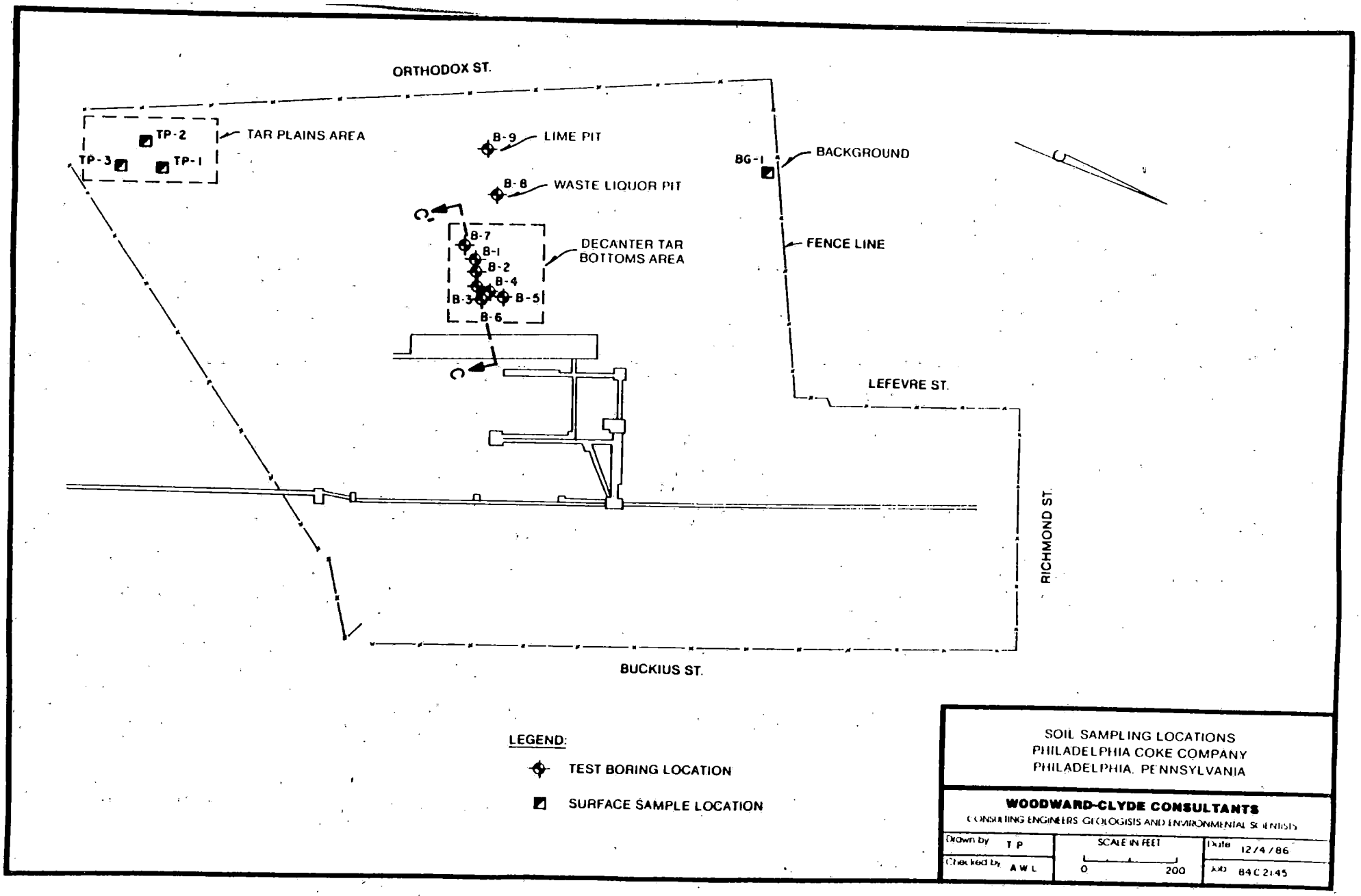


Table 4

SUMMARY OF SOIL SAMPLING PROGRAM
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Location	Approximate Depth (ft)	No. of Samples	Sampling Method
Decanter Tar Bottoms Area			
B-1	6, 10	2	HSA
B-2	6, 10	2	HSA
B-3	5, 7	2	HSA
B-4	10	1	—
B-5	8	1	HSA
B-6	8	1	HSA
B-7	6,8	2	HSA
Waste Liquor Pit			
B-8	10	1	HSA
Lime Pit			
B-9	4,8	2	HSA
Tar Plains			
TP1	0.5	1	Hand Tools
TP2	0.5	1	Hand Tools
TP3	0.5	1	Hand Tools
Background			
BG-1	0.5	1	Hand Tools

Note: HSA = Hollow Stem Auger

TABLE 5

SOIL QUALITY RESULTS
PRIORITY POLLUTANT ORGANICS DETECTED
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Parameter	Units	B-1A	B-1B	B-2A	B-2B
Acid Extractables					
Phenol	ppb	1200	BDL	BDL	BDL
2,4-Dimethylphenol	ppb	220	BDL	270	BDL
Total Acids		1420	BDL	270	BDL
Base/Neutral Extractables					
Naphthalene	ppb	81,000	7,800	13,000	250
Acenaphthylene	ppb	17,000	1,900	2,000	BDL
Acenapthene	ppb	BDL	BDL	BDL	BDL
Fluorene	ppb	16,000	2,500	5,600	BDL
Phenanthrene	ppb	33,000	6,400	1,500	220
Anthracene	ppb	7,900	1,300	3,800	BDL
Fluoranthene	ppb	18,000	3,800	8,900	300
Pyrene	ppb	11,000	3,400	8,000	300
Benzo (A) Anathracene	ppb	6,500	1,800	3,700	240
Bis (2-Ethylhexyl) Phthalate	ppb	BDL	BDL	BDL	BDL
Chrysene	ppb	5,800	1,700	3,600	270
Benzo (B) Fluoranthene	ppb	6,500	930	4,800	420
Benzo (K) Fluoranthene	ppb	6,500	1,400	4,800	420
Benzo (A) Pyrene	ppb	3,300	880	2,400	260
Indeno (1,2,3-c,d) Pyrene	ppb	BDL	BDL	BDL	BDL
Dibenzo, (A,H) Anthracene	ppb	BDL	BDL	BDL	BDL
Benzo (G,H,I) Perylene	ppb	BDL	BDL	BDL	BDL
Total Base/Neutrals		212,500	33,810	62,100	2,680
Volatile Organics					
Methylene Chloride	ppb	BDL	BDL	18	BDL
Benzene	ppb	80	BDL	BDL	BDL
Toluene	ppb	50	BDL	BDL	BDL
Ethylbenzene	ppb	84	BDL	BDL	BDL
Total Volatiles		214	BDL	18	BDL

BDL - Below Detection Limit

TABLE 5

SOIL QUALITY RESULTS
PRIORITY POLLUTANT ORGANICS DETECTED
PHILADELPHIA, COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Parameter	Units	B-3A	B-3B	B-4A	B-5A	B-6
Acid Extractables						
Phenol	ppb	910	BDL	360	BDL	27(
2,4-Dimethylphenol	ppb	180	BDL	BDL	2600	29(
Total Acids		1090	BDL	360	2600	56(
Base/Neutral Extractables						
Naphthalene	ppb	52,000	510	4,000	380,000	33(
Acenaphthylene	ppb	13,000	BDL	420	BDL	BDI
Acenapthene	ppb	3,900	BDL	1,200	140,000	BDI
Fluorene	ppb	37,000	180	860	140,000	BDI
Phenanthrene	ppb	110,000	780	2,500	410,000	290
Anthracene	ppb	34,000	220	1,700	86,000	BDI
Fluoranthene	ppb	90,000	740	2,400	300,000	300
Pyrene	ppb	55,000	720	1,700	200,000	350
Benzo (A) Anathracene	ppb	36,000	400	1,000	96,000	190
Bis (2-Ethylhexyl) Phthalate	ppb	BDL	BDL	BDL	BDL	BDI
Chrysene	ppb	3,400	350	1,300	85,000	210
Benzo (B) Fluoranthene	ppb	44,000	380	1,400	130,000	280
Benzo (K) Fluoranthene	ppb	44,000	380	1,400	130,000	280
Benzo (A) Pyrene	ppb	24,000	220	710	69,000	190
Indeno (1,2,3-c,d) Pyrene	ppb	9,500	BDL	340	30,600	BDL
Dibenzo, (A,H) Anthracene	ppb	3,900	BDL	BDL	BDL	BDL
Benzo (G,H,I) Perylene	ppb	8,400	BDL	350	32,600	BDL
Total Base/Neutrals		568,100	4,880	21,280	2,229,200	2,42(
Volatile Organics						
Methylene Chloride	ppb	11	BDL	BDL	BDL	BDL
Benzene	ppb	BDL	BDL	BDL	BDL	9
Toluene	ppb	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	ppb	BDL	BDL	BDL	BDL	BDL
Total Volatiles		11	BDL	BDL	BDL	9

BDL - Below Detection Limit

TABLE 5

SOIL QUALITY RESULTS
PRIORITY POLLUTANT ORGANICS DETECTED
PHILADELPHIA, COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Parameter	Units	B-7A	B-7B	B-8A	B-9A	B-9I
Acid Extractables						
Phenol	ppb	1100	330	BDL	BDL	570
2,4-Dimethylphenol	ppb	320	BDL	BDL	BDL	BDI
Total Acids		1420	330	BDL	BDL	570
Base/Neutral Extractables						
Naphthalene	ppb	6,300	1,000	11,000	46,000	46,0(
Acenaphthylene	ppb	BDL	BDL	780	4,800	2(
Acenapthene	ppb	320	BDL	6,100	250	BDI
Fluorene	ppb	BDL	BDL	4,600	2,200	2·
Phenanthrene	ppb	360	BDL	10,000	7,500	9'
Anthracene	ppb	370	BDL	3,200	2,300	1,2(
Fluoranthene	ppb	1,000	290	6,800	8,300	6:
Pyrene	ppb	900	280	4,400	4,400	5:
Benzo (A) Anathracene	ppb	1,000	BDL	2,200	3,700	3(
Bis (2-Ethylhexyl) Phthalate	ppb	BDL	BDL	BDL	BDL	1:
Chrysene	ppb	880	BDL	2,100	3,500	3·
Benzo (B) Fluoranthene	ppb	1,700	230	2,100	6,400	4:
Benzo (K) Fluoranthene	ppb	1,700	230	2,100	6,400	4:
Benzo (A) Pyrene	ppb	980	BDL	1,300	3,500	2:
Indeno (1,2,3-c,d)Pyrene	ppb	490	BDL	260	1,800	BDI
Dibenzo (A,H) Anthracene	ppb	BDL	BDL	BDL	190	BDI
Benzo (G,H,I) Perylene	ppb	530	BDL	250	1,700	BDI
Total Base/Neutrals		16,530	2,030	57,190	102,940	51,9:
Volatile Organics						
Methylene Chloride	ppb	BDL	BDL	BDL	BDL	BDL
Benzene	ppb	9	15	BDL	BDL	10
Toluene	ppb	BDL	BDL	BDL	BDL	5
Ethylbenzene	ppb	BDL	BDL	BDL	BDL	BDL
Total Volatiles		9	15	BDL	BDL	15

BDL - Below Detection Limit

TABLE 5

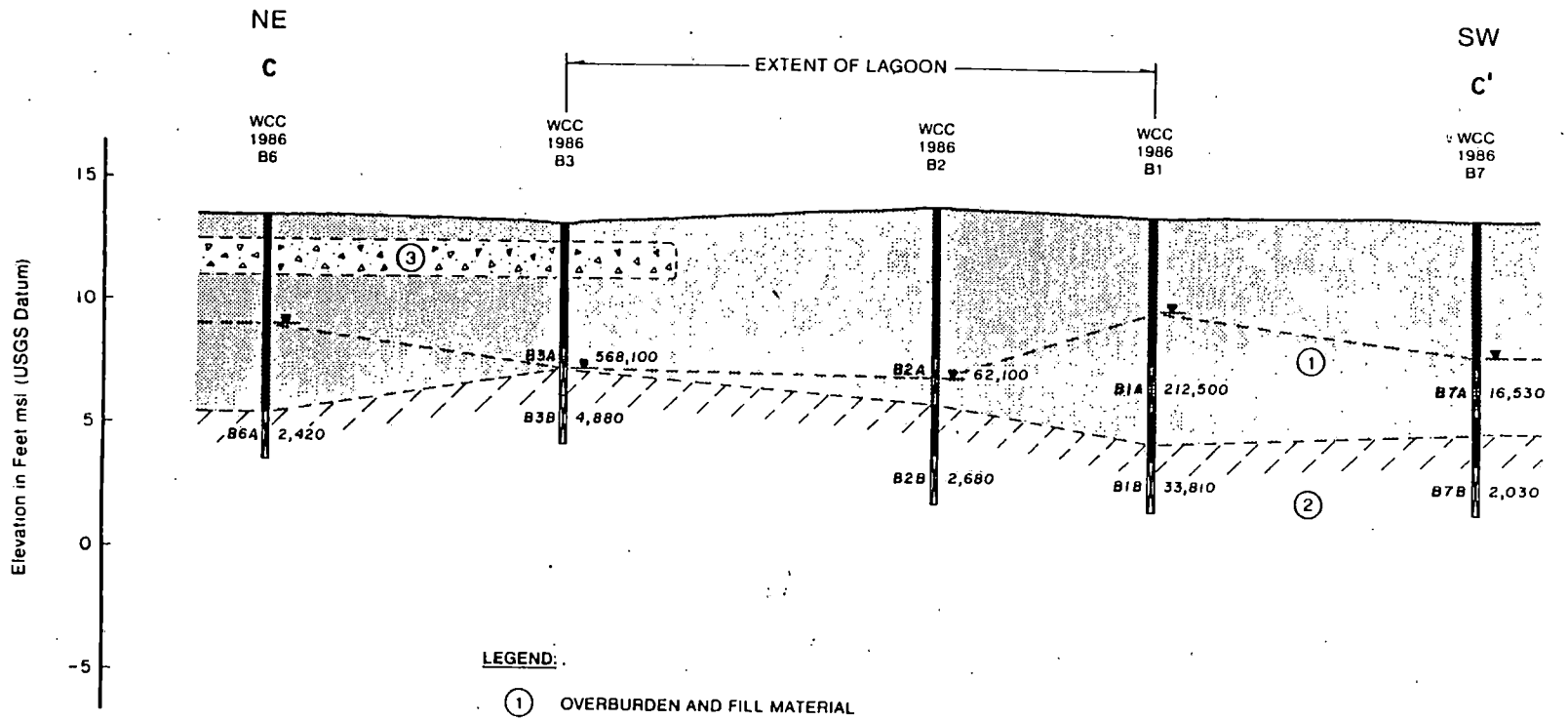
SOIL QUALITY RESULTS
PRIORITY POLLUTANT ORGANICS DETECTED
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

Parameter	Units	Field Blank1	Field Blank	TP-1	TP-2	TP-3	BG
Acid Extractables							
Phenol	ppb	BDL	BDL	BDL	BDL	BDL	BD
2,4-Dimethylphenol	ppb	BDL	BDL	BDL	BDL	BDL	BD
Total Acids		BDL	BDL	BDL	BDL	BDL	BD
Base/Neutral Extractables							
Naphthalene	ppb	BDL	18	220,000	310	540	BI
Acenaphthylene	ppb	BDL	BDL	6,500	BDL	220	BI
Acenapthene	ppb	BDL	BDL	BDL	BDL	BDL	BI
Fluorene	ppb	BDL	BDL	69,000	BDL	BDL	BI
Phenanthrene	ppb	BDL	11	230,000	590	1,000	1,
Anthracene	ppb	BDL	BDL	53,000	200	480	
Fluoranthene	ppb	BDL	5	130,000	310	1,900	1,
Pyrene	ppb	BDL	BDL	140,000	360	2,200	1,
Benzo (A) Anathracene	ppb	BDL	BDL	54,000	220	1,100	
Bis (2-Ethylhexyl) Phthalate	ppb	10	8	BDL	BDL	BDL	BI
Chrysene	ppb	BDL	BDL	49,000	450	1,300	
Benzo (B) Fluoranthene	ppb	BDL	BDL	70,000	780	1,900	1,
Benzo (K) Fluoranthene	ppb	BDL	BDL	70,000	780	1,900	1,
Benzo (A) Pyrene	ppb	BDL	BDL	40,000	450	960	
Indeno (1,2,3-c,d) Pyrene	ppb	BDL	BDL	BDL	290	440	
Dibenzo, (A,H) Anthracene	ppb	BDL	BDL	BDL	BDL	210	BI
Benzo (G,H,I) Perylene	ppb	BDL	BDL	BDL	310	460	
Total Base/Neutrals		10	42	1,131,500	5,050	14,610	8,
Volatile Organics							
Methylene Chloride	ppb	BDL	BDL	10	17	BDL	BDI
Benzene	ppb	BDL	BDL	BDL	BDL	6	BDI
Toluene	ppb	BDL	BDL	22	BDL	BDL	BDI
Ethylbenzene	ppb	13	BDL	BDL	BDL	BDL	BD
Total Volatiles		13	BDL	32	17	6	BD

BDL - Below Detection Limit

Figure 9

Geologic Cross-Section
of the Tar Decanter Bottoms Area



LEGEND:

1. OVERBURDEN AND FILL MATERIAL
2. GRAY TO GRAY-BROWN SILTY CLAY
3. CONCRETE

ESTIMATED GROUNDWATER LEVELS

TEST BORING

SOIL SAMPLE LOCATION

4,880 TOTAL BASE/NEUTRAL EXTRACTABLE CONCENTRATION IN SOIL SAMPLE

NOTE: VERTICAL EXAGGERATION x2.5

TOTAL BASE/NEUTRAL EXTACTABLES (ppb)
DECANTER TAR BOTTOMS AREA
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by D.B	SCALE IN FEET 0 13	Date 12/15/86
Checked by A W L.		Job 84C2145

Tar Plains Area

WCC composited three soil samples in this area over a 6- to 18-inch depth interval. WCC observed significant signs of contamination at excavation TP-1, such as stained soils, oily sheen, and strong odors, but not at excavations TP-2 and TP-3.

The analytical results showed no presence of acid extractables and low levels of volatile organics, but they showed substantial concentrations (1,131,500 ppb) for base/neutral extractables (see Table 5). These results confirmed the observed signs of soil contamination.

Lime Pit Area

WCC sampled the soil at depths of 4 to 6 feet (B-9A) and 8 to 10 feet (B-9B) (see Table 5). WCC observed evidence of soil contamination such as a stained subsurface and a strong odor.

The analytical results did not reveal the presence of acid extractable or volatile organics, but they did show significant concentrations of base/neutral extractables at sampling location B-9A. Analyses of samples from boring B-9B revealed the presence of phenol, benzene, and toluene, but less significant concentrations of base/neutral extractables.

Waste Liquor Pit

WCC sampled the soil potentially contaminated by the waste liquor pit at depths of 8 to 10 feet. The only boring was identified as B-8 and was located 2 feet outside the southwest wall of the pit. At a depth of 6.5 feet, WCC observed stained soil and a very strong odor. Analytical results revealed that only base/neutral extractables (a total of 15) had contaminated the soil, with a total concentration of 57,190 ppb.

Background

WCC collected a background sample composited over a depth interval of 6 to 12 inches at the northwest corner of the site. Analytical results revealed that base/neutral extractables (a total of 11) had contaminated this part of the site, with a total concentration of 8,950 ppb. According to Mr. Jacobson this sample is typical of local soil conditions for the area which is heavily industrial and has been contaminated over the years.

4.4 AIR RELEASES

Because of the types of units operated at the site and the types of wastes managed in those units, it is likely that air releases have occurred. However, EPA and PADER files did not contain any documentation of air releases during PCCI operations. As discussed in the Section 4.3, the soil at the site emitted strong odors. These odors suggests a potential for air releases during demolition activities. According to Mr. Hogeboom, East Coast Salvage took all necessary steps to prevent air releases while removing the asbestos.

5.0 HUMAN AND ENVIRONMENTAL TARGETS

The previous section discussed evidence of actual or potential releases of contaminants to the ground water, surface water, soil, and air. This section addresses human and environmental targets that are likely to be affected by releases through each of these pathways.

5.1 GROUND-WATER RELEASE TARGETS

There are neither public nor private water wells near PCCI according to Sara Ginzler of PADER and David Gawer of the Philadelphia Water Department. Also, Mr. Jacobson is unsure whether the contaminated ground water recharges the Delaware river or any other surface water body. Should the ground water beneath the site recharge the Delaware River, there would be a potential for exposure of human and environmental targets.

5.2 SURFACE-WATER RELEASE TARGETS

The Delaware River is not used for fishing, swimming, or boating anywhere near the site according to Mr. Gawer. A water treatment plant, Baxter Treatment Plant, has a water intake approximately five miles upstream and because of tidal effect, some contamination of this water is possible.

5.3 SOIL RELEASE TARGETS

In the early 1950s, PCCI employed 350 people; shortly before it stopped operating, 180 people worked at PCCI. Therefore, due to the considerable number of employees at PCCI, it is possible that a large number of workers may have been at risk through their contact with the soil at the site. In addition, PCCI is located in a residential area, activities (demolition) that will create a dusty environment may potentially affect people living in the area. Furthermore, although the site is fenced and guarded from 8:00 am to 4:00 pm daily, occasionally, some children using wire cutters enter the site; this may potentially affect their health.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF FINDINGS

PRC conducted a preliminary review/visual site inspection (PR/VSI) of the Philadelphia Coke Company, Inc. (PCCI). PCCI, located in Philadelphia, operated this plant for 53 years to manufacture coke oven tar and coke oven gas. The plant stopped operating on May 17, 1982. A summary of PRC's findings during the PR/VSI follows:

- PCCI operated eight SWMUs to manage hazardous and nonhazardous wastes generated at the site.
- Following plant shutdown, PCCI reportedly removed all hazardous wastes, shipped them off-site for disposal, and partially dismantled the plant.
- PCCI installed six ground-water monitoring wells at the site. PCCI sampled four of these wells and submitted ground-water quality data that indicate contamination of the ground water.
- Despite hydrogeologic studies conducted by WCC, it is not certain whether monitoring well W-4 can be considered to provide reliable information on background ground-water quality.
- Recently, PCCI submitted soil quality data that indicate soil contamination.

6.2 RECOMMENDATIONS

As explained in the summary of findings section, ground water, soil, and possibly surface water are contaminated due to PCCI operations. However, since PCCI has undertaken closure activities and had partially cleaned the site, PRC recommends no sampling for any of the contaminated media. Also, PRC recommends that:

- PCCI continue the cleanup efforts until clean closure can be achieved.
- PCCI install wells in the deep aquifer beneath the site to determine if it has been contaminated as well.

LIST OF INTERVIEWEES

U.S. EPA Region 3; Philadelphia, PA
Eugene Dennis, Hydrogeologist (215) 597-8555

Pennsylvania Department of Environmental Resources; Norristown, PA
Sara Ginzler, Hydrogeologist (215) 270-1948

Philadelphia Coke Company
James Hogeboom, Vice-President (602) 981-5443

Philadelphia Water Department; Philadelphia, PA,
David Gawer, Supervisor (215) 686-3900

REFERENCES

Letters

PADER, 1986, Letter to Peter Jacobson, WCC, October 31, 1986.

PADER, 1985a, Letter to James L. Hogeboom, PCCI, November 15, 1985.

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WCC, 1986d, Third Quarter Ground-Water Sampling Results, January 17, 1986.

WCC, 1985a, Second Quarter Ground-Water Sampling Results, September 26, 1985.

WCC, 1985b, First Quarter Ground-Water Monitoring Results, July 16, 1985.

WCC, 1985c, Ground-Water Sampling and Analysis Plan, March 4, 1985.

Personal Communications

Gawer, David, 1987, Supervisor, Philadelphia Water Department, Personal Communications with Jean R. Desruisseaux, PRC, June 1987.

APPENDIX A

GROUND-WATER QUALITY RESULTS

WELL NUMBER W-1

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
WQP									
	ALKALINITY	mg/l	73.1000	251.0000	62.9000	30.2000	49.8000	98.0000	61.4000
	AMMONIA	mg/l	56.0000	333.0000	42.0000	105.0000	135.0000	164.0000	107.0000
	COLIFORM, TOTAL	col/100m	100.0000	13.0000	<2.0000	<2.0000	NS	2.0000	<2.0000
	BIOCHEMICAL OXYGEN DEMAND	mg/l	6.6000	NS	5.6000	0.9000	2.2000	42.0000	2.5000
	TOTAL ORGANIC CARBON	mg/l	8.7000	5.9700	6.9200	2.7300	3.6300	2.8000	4.8000
	CHEMICAL OXYGEN DEMAND	mg/l	48.0000	573.0000	14.5000	50.4000	18.5000	66.0000	67.1000
	CHLORIDE	mg/l	27.8000	416.0000	13.2000	12.0000	11.6000	NS	NS
	CYANIDE	mg/l	1.5000	38.0000	0.0860	0.0450	0.0090	10.3000	<0.0050
	FLUORIDE	mg/l	0.9100	1.0000	0.7500	0.6900	0.8000	1.1200	2.6000
	ALUMINUM, DISSOLVED	mg/l	<0.5000	<0.5000	NS	NS	NS	NS	NS
	ARSENIC, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	BARIUM, DISSOLVED	mg/l	<0.5000	0.5000	NS	NS	NS	NS	NS
	CHROMIUM, DISSOLVED	mg/l	0.0050	<0.0040	0.0010	<0.0010	<0.0010	<0.0010	0.0020
	IRON, DISSOLVED	mg/l	16.4000	49.0000	4.5000	<0.1000	<0.1000	1.4000	6.4000
	LEAD, DISSOLVED	mg/l	0.0030	<0.0010	NS	NS	NS	NS	NS
	MANGANESE, DISSOLVED	mg/l	9.4000	12.0000	6.1200	6.2100	6.0000	8.9000	8.5000
	MERCURY, DISSOLVED	mg/l	<0.0002	<0.0050	NS	NS	NS	NS	NS
	SELENIUM, DISSOLVED	mg/l	0.0050	0.0050	NS	NS	NS	NS	NS
	SILVER, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	SODIUM, DISSOLVED	mg/l	29.4000	144.0000	13.0000	12.2000	13.3000	31.0000	19.0000
	NITRATE,NITROGEN	mg/l	2.2000	<0.0050	0.9700	1.2000	0.4400	1.0400	8.3000
	TOTAL ORGANIC HALOGENS	ug/l	215.0000	19.0000	<5.0000	<5.0000	93.0000	7.0000	18.0000
	2,4 - D	ug/l	<0.2500	<2.5000	NS	NS	NS	NS	NS
	2,4,5 - TP	ug/l	<0.2500	<10.0000	NS	NS	NS	NS	NS
	LINDANE	ug/l	<0.5000	<0.0030	NS	NS	NS	NS	NS
	ENDRIN	ug/l	<0.5000	<0.0220	NS	NS	NS	NS	NS
	METHOXYCHLOR	ug/l	<2.5000	<0.0490	NS	NS	NS	NS	NS
	TOXAPHENE	ug/l	<25.0000	<0.0980	NS	NS	NS	NS	NS
	TOTAL PHENOLS	mg/l	<0.0050	0.0100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	PH	standard	6.6400	6.4000	6.4500	6.7100	6.9000	6.5500	6.2800
	TOTAL DISSOLVED SOLIDS	umhos/cm	1120.0000	2830.0000	1400.0000	1400.0000	1210.0000	1070.0000	1260.0000
	SPECIFIC CONDUCTANCE	mg/l	1470.0000	4094.0000	1620.0000	1670.0000	2020.0000	2690.0000	2120.0000
	SULFATE	mg/l	871.0000	1675.0000	990.0000	1020.0000	1040.0000	136.0000	1080.0000

WELL NUMBER W-2

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
WQP									
	ALKALINITY	mg/l	1040.0000	1093.0000	709.0000	630.0000	391.0000	40.0000	1070.0000
	AMMONIA	mg/l	917.0000	1260.0000	1520.0000	682.0000	350.0000	1110.0000	1226.0000
	COLIFORM, TOTAL	col/100m	1800.0000	2400.0000	33.0000	<2.0000	NS	5.0000	350.0000
	BIOCHEMICAL OXYGEN DEMAND	mg/l	220.0000	NS	7.9000	515.0000	300.0000	120.0000	330.0000
	TOTAL ORGANIC CARBON	mg/l	5.6000	7.6700	4.5400	194.0000	109.0000	254.0000	371.0000
	CHEMICAL OXYGEN DEMAND	mg/l	1170.0000	1856.0000	1780.0000	1500.0000	393.0000	304.0000	1700.0000
	CHLORIDE	mg/l	1210.0000	1633.0000	1990.0000	773.0000	473.0000	NS	NS
	CYANIDE	mg/l	159.0000	120.0000	84.0000	24.6000	31.2000	189.0000	9.0000
	FLUORIDE	mg/l	0.9500	1.5000	2.5000	3.8000	5.6000	4.0500	3.2000
	ALUMINUM, DISSOLVED	mg/l	<0.5000	<0.5000	NS	NS	NS	NS	NS
	ARSENIC, DISSOLVED	mg/l	0.0120	0.0260	NS	NS	NS	NS	NS
	BARIUM, DISSOLVED	mg/l	<0.5000	<0.5000	NS	NS	NS	NS	NS
	CHROMIUM, DISSOLVED	mg/l	0.0510	0.0160	0.0120	0.0020	0.0010	0.0090	0.0080
	IRON, DISSOLVED	mg/l	36.8000	2.6900	0.8000	0.3500	0.2000	3.4000	0.5000
	LEAD, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	MANGANESE, DISSOLVED	mg/l	3.0000	0.7100	0.2900	5.5300	11.4000	2.6000	0.8500
	MERCURY, DISSOLVED	mg/l	<0.0002	<0.0050	NS	NS	NS	NS	NS
	SELENIUM, DISSOLVED	mg/l	0.0050	0.0030	NS	NS	NS	NS	NS
	SILVER, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	SODIUM, DISSOLVED	mg/l	411.0000	430.0000	420.0000	232.0000	274.0000	320.0000	430.0000
	NITRATE,NITROGEN	mg/l	<0.1500	<0.0050	0.1500	<0.1500	<0.1500	<0.5200	NS
	TOTAL ORGANIC HALOGENS	ug/l	78.0000	69.0000	<5.0000	5180.0000	NS	14.0000	99.0000
	2,4 - D	ug/l	1.1900	<2.5000	NS	NS	NS	NS	NS
	2,4,5 - TP	ug/l	<0.2500	<10.0000	NS	NS	NS	NS	NS
	LINDANE	ug/l	<0.5000	<0.0300	NS	NS	NS	NS	NS
	ENDRIN	ug/l	<0.5000	<0.2200	NS	NS	NS	NS	NS
	METHOXYCHLOR	ug/l	<2.5000	<0.4900	NS	NS	NS	NS	NS
	TOXAPHENE	ug/l	<25.0000	<0.9800	NS	NS	NS	NS	NS
	TOTAL PHENOLS	mg/l	<0.0050	36.9000	3.8500	0.7200	0.3700	2.3100	1.8400
	PH	standard	7.1500	7.4500	8.3100	7.7500	6.7500	7.7800	7.4100
	TOTAL DISSOLVED SOLIDS	umhos/cm	4920.0000	3870.0000	4190.0000	5180.0000	5290.0000	1710.0000	4850.0000
	SPECIFIC CONDUCTANCE	mg/l	8010.0000	9929.0000	9750.0000	7750.0000	6650.0000	10400.0000	11100.0000
	SULFATE	mg/l	2950.0000	2512.0000	2700.0000	3650.0000	3500.0000	2960.0000	3300.0000

WELL NUMBER W-3

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
WQP	ALKALINITY	mg/l	65.5000	44.2000	47.1000	39.3000	39.8000	58.0000	44.6000
	AMMONIA	mg/l	14.3000	13.1000	6.3000	1.2700	2.4800	4.5500	5.9100
	COLIFORM, TOTAL	col/100m	400.0000	1.0000	5.0000	<2.0000	NS	<2.0000	2.0000
	BIOCHEMICAL OXYGEN DEMAND	mg/l	2.4000	NS	0.9000	4.6500	6.8000	17.0000	4.7000
	TOTAL ORGANIC CARBON	mg/l	6.7000	5.5100	3.1000	1.3900	1.7500	1.6000	2.5000
	CHEMICAL OXYGEN DEMAND	mg/l	12.7000	57.3000	14.5000	36.0000	<10.0000	<10.0000	<10.0000
	CHLORIDE	mg/l	12.3000	14.8000	17.0000	11.6000	9.5000	NS	NS
	CYANIDE	mg/l	0.0040	0.0010	0.0250	0.0060	0.0570	<0.0660	0.0120
	FLUORIDE	mg/l	0.6200	0.4700	0.2800	0.4300	0.4400	0.5300	0.4900
	ALUMINUM, DISSOLVED	mg/l	<0.5000	<0.5000	NS	NS	NS	NS	NS
	ARSENIC, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	BARIUM, DISSOLVED	mg/l	<0.5000	<0.5000	NS	NS	NS	NS	NS
	CHROMIUM, DISSOLVED	mg/l	0.0040	0.0020	0.0060	0.0020	<0.0010	<0.0010	0.0050
	IRON, DISSOLVED	mg/l	0.5000	<0.0500	0.1000	<0.1000	<0.1000	<0.1000	38.0000
	LEAD, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	MANGANESE, DISSOLVED	mg/l	1.7000	1.4000	1.0400	0.6700	0.5800	1.3000	3.2000
	MERCURY, DISSOLVED	mg/l	0.0002	<0.0050	NS	NS	NS	NS	NS
	SELENIUM, DISSOLVED	mg/l	0.0050	0.0030	NS	NS	NS	NS	NS
	SILVER, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	SODIUM, DISSOLVED	mg/l	54.2000	53.0000	41.0000	25.0000	23.1000	34.0000	24.0000
	NITRATE,NITROGEN	mg/l	15.3000	10.5000	15.0000	11.9000	7.0500	5.4000	5.8000
	TOTAL ORGANIC HALOGENS	ug/l	48.0000	7.0000	<5.0000	<5.0000	1040.0000	<5.0000	13.0000
	2,4 - D	ug/l	<0.2500	<1.0000	NS	NS	NS	NS	NS
	2,4,5 - TP	ug/l	<0.2500	<1.0000	NS	NS	NS	NS	NS
	LINDANE	ug/l	<0.0500	<0.0030	NS	NS	NS	NS	NS
	ENDRIN	ug/l	<0.0500	<0.0220	NS	NS	NS	NS	NS
	METHOXYCHLOR	ug/l	<0.2500	<0.0490	NS	NS	NS	NS	NS
	TOXAPHENE	mg/l	<2.5000	<0.0980	NS	NS	NS	NS	NS
	TOTAL PHENOLS	standard	<0.0050	<0.0050	<0.0050	<0.0050	0.0080	<0.0050	<0.0050
	PH	umhos/cm	6.5000	6.1900	6.1500	6.4000	6.9500	7700	6.4700
	TOTAL DISSOLVED SOLIDS	mg/l	880.0000	921.0000	762.0000	511.0000	572.0000	252.0000	848.0000
	SPECIFIC CONDUCTANCE	mg/l	1070.0000	1097.0000	903.0000	702.0000	534.0000	754.0000	583.0000
	SULFATE	mg/l	513.0000	420.0000	360.0000	249.0000	51.9000	298.0000	200.0000

WELL NUMBER W-4

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
WQP									
	ALKALINITY	mg/l	89.8000	314.0000	17.9000	31.1000	19.8000	115.0000	205.0000
	AMMONIA	mg/l	20.7000	60.2000	0.2600	0.7400	0.0520	6.8000	24.1000
	COLIFORM, TOTAL	col/100m	2000.0000	8.0000	>2400.0000	2.0000	NS	<2.0000	13.0000
	BIOCHEMICAL OXYGEN DEMAND	mg/l	37.0000	NS	1.0000	3.9500	2.4000	12.0000	69.0000
	TOTAL ORGANIC CARBON	mg/l	130.0000	3.1600	2.7800	2.5500	<0.5000	6.3000	15.7000
	CHEMICAL OXYGEN DEMAND	mg/l	44.0000	269.0000	<7.0000	43.8000	11.9000	50.0000	155.0000
	CHLORIDE	mg/l	22.7000	152.0000	7.3000	5.5000	10.0000	NS	NS
	CYANIDE	mg/l	3.6000	16.8000	0.0020	0.0030	0.0030	3.6800	16.8000
	FLUORIDE	mg/l	0.1800	0.0800	0.0600	0.1700	0.1200	0.3800	0.5400
	ALUMINUM, DISSOLVED	mg/l	3.9000	<0.5000	NS	NS	NS	NS	NS
	ARSENIC, DISSOLVED	mg/l	0.0080	0.0080	NS	NS	NS	NS	NS
	BARIUM, DISSOLVED	mg/l	<0.5000	0.5000	NS	NS	NS	NS	NS
	CHROMIUM, DISSOLVED	mg/l	0.0200	0.0060	<0.0010	<0.0010	<0.0010	<0.0010	0.0040
	IRON, DISSOLVED	mg/l	17.1000	62.0000	0.2000	<0.1000	<0.1000	15.1000	177.0000
	LEAD, DISSOLVED	mg/l	0.0120	0.0020	NS	NS	NS	NS	NS
	MANGANESE, DISSOLVED	mg/l	2.3000	4.7000	0.3100	0.5900	0.2400	2.4000	2.9000
	MERCURY, DISSOLVED	mg/l	0.0005	<0.0050	NS	NS	NS	NS	NS
	SELENIUM, DISSOLVED	mg/l	0.0080	0.0040	NS	NS	NS	NS	NS
	SILVER, DISSOLVED	mg/l	<0.0010	<0.0010	NS	NS	NS	NS	NS
	SODIUM, DISSOLVED	mg/l	30.8000	184.0000	2.7000	1.9000	4.1500	9.9000	28.5000
	NITRATE,NITROGEN	mg/l	<0.1500	<0.0050	7.0000	1.2500	4.5200	0.1100	<0.2600
	TOTAL ORGANIC HALOGENS	ug/l	82.0000	18.0000	<5.0000	6.0000	NS	<5.0000	<5.0000
	2,4 - D	ug/l	<0.2500	<1.0000	NS	NS	NS	NS	NS
	2,4,5 - TP	ug/l	<0.2500	<1.0000	NS	NS	NS	NS	NS
	LINDANE	ug/l	<0.5000	<0.0030	NS	NS	NS	NS	NS
	ENDRIN	ug/l	<0.5000	<0.0220	NS	NS	NS	NS	NS
	METHOXYCHLOR	ug/l	<2.5000	<0.0490	NS	NS	NS	NS	NS
	TOXAPHENE	ug/l	<25.0000	<0.0980	NS	NS	NS	NS	NS
	TOTAL PHENOLS	mg/l	<0.0050	0.0140	<0.0050	<0.0050	0.0060	<0.0050	<0.0050
	PH	standard	6.9900	6.5700	5.8900	6.5000	6.3400	6.4900	6.6700
	TOTAL DISSOLVED SOLIDS	umhos/cm	108.0000	1320.0000	218.0000	163.0000	230.0000	210.0000	1405.0000
	SPECIFIC CONDUCTANCE	mg/l	461.0000	1777.0000	186.0000	158.0000	NS	369.0000	588.0000
	SULFATE	mg/l	111.0000	511.0000	32.0000	30.0000	51.9000	33.1000	80.0000

WELL NUMBER W-1

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
VOLATILES									
	CHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	VINYL CHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	METHYLENE CHLORIDE	ug/l	ND	<1.0000	9.2000	ND	4.4000	<5.0000	ND
	ACROLEIN	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	ACRYLONITRILE	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	1,1-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1-DICHLOROETHANE	ug/l	ND	ND	ND	ND	<1.0000	<5.0000	ND
	TRANS-1,2-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROFORM	ug/l	ND	ND	ND	<1.0000	ND	<5.0000	ND
	1,2-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,1-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CARBON TETRACHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMODICHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,2-DICHLOROPROPANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,3-DICHLOROPROPENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	TRICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	BENZENE	ug/l	ND	1.3000	ND	ND	ND	<5.0000	ND
	DIBROMOCHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	2-CHLOROETHYLVINYL ETHER	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOFORM	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TETRACHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2,2-TETRACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TOLUENE	ug/l	ND	0.2000	ND	7.7000	ND	<5.0000	ND
	CHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	ETHYLBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND

WELL NUMBER W-2

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
VOLATILES									
	CHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	VINYL CHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	METHYLENE CHLORIDE	ug/l	6.2000	<1.0000	ND	ND	2.4000	<5.0000	ND
	ACROLEIN	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	ACRYLONITRILE	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	1,1-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TRANS-1,2-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROFORM	ug/l	ND	ND	<1.0000	ND	ND	<5.0000	ND
	1,2-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,1-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CARBON TETRACHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMODICHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,2-DICHLOROPROPANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,3-DICHLOROPROPENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	TRICHLOROETHENE	ug/l	ND	<0.2000	ND	ND	ND	NS	ND
	BENZENE	ug/l	143.0000	234.0000	86.0000	ND	73.4000	490.0000	ND
	DIBROMOCHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2-TRICHLOROETHANE	ug/l	ND	<5.0000	ND	ND	ND	<5.0000	ND
	2-CHLOROETHYLVINYL ETHER	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOFORM	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TETRACHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2,2-TETRACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TOLUENE	ug/l	60.0000	76.0000	81.0000	ND	17.6000	59.4000	ND
	CHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	ETHYLBENZENE	ug/l	3.0000	5.1000	43.0000	ND	ND	16.8000	ND

WELL NUMBER W-3

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
VOLATILES									
	CHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	VINYL CHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	METHYLENE CHLORIDE	ug/l	3.8000	<1.0000	ND	ND	6.1000	<5.0000	ND
	ACROLEIN	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	ACRYLONITRILE	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	1,1-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1-DICHLOROETHANE	ug/l	ND	ND	ND	ND	<1.0000	<5.0000	ND
	TRANS-1,2-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROFORM	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,2-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,1-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CARBON TETRACHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMODICHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,2-DICHLOROPROPANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,3-DICHLOROPROPENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	TRICHLOROETHENE	ug/l	ND	<0.2000	ND	ND	ND	NS	ND
	BENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	DIBROMOCHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	2-CHLOROETHYLVINYL ETHER	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOFORM	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TETRACHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2,2-TETRACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TOLUENE	ug/l	ND	<0.2000	ND	ND	ND	<5.0000	ND
	CHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	ETHYLBENZENE	ug/l	ND	<1.0000	ND	ND	ND	<5.0000	ND

WELL NUMBER W-4

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
VOLATILES									
	CHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	VINYL CHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	METHYLENE CHLORIDE	ug/l	3.4000	<1.0000	ND	ND	ND	<5.0000	ND
	ACROLEIN	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	ACRYLONITRILE	ug/l	ND	ND	ND	ND	ND	<80.0000	ND
	1,1-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TRANS-1,2-DICHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROFORM	ug/l	ND	ND	ND	<1.0000	ND	<5.0000	ND
	1,2-DICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,1-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CARBON TETRACHLORIDE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMODICHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,2-DICHLOROPROPANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,3-DICHLOROPROPENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	TRICHLOROETHENE	ug/l	ND	<0.2000	ND	ND	ND	NS	ND
	BENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	DIBROMOCHLOROMETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2-TRICHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	2-CHLOROETHYLVINYL ETHER	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	BROMOFORM	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TETRACHLOROETHENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	1,1,2,2-TETRACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	TOLUENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	CHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND
	ETHYLBENZENE	ug/l	ND	ND	ND	ND	ND	<5.0000	ND

WELL NUMBER W-1

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
ACIDS									
	PHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DIMETHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLORO-3-METHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4,6-TRICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-METHYL-4,6-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	NS	ND
	PENTACHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND

WELL NUMBER W-2

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
ACIDS									
	PHENOL	ug/l	2710.0000	21.0000	ND	167.0000	ND	ND	170.0000
	2-CHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DIMETHYLPHENOL	ug/l	27600.0000	255.0000	ND	479.0000	10.1000	663.0000	104.0000
	2,4-DICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLORO-3-METHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4,6-TRICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-METHYL-4,6-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	NS	ND
	PENTACHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND

WELL NUMBER H-3

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/35 CONCENTRATION	DATE 01/21/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
ACIDS									
	PHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DIMETHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLORO-3-METHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4,6-TRICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-METHYL-4,6-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	NS	ND
	PENTACHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND

WELL NUMBER W-4

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
ACIDS									
	PHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4 DIMETHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLORO-3-METHYLPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4,6-TRICHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-NITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-METHYL-4,6-DINITROPHENOL	ug/l	ND	ND	ND	ND	ND	ND	ND
	PENTACHLOROPHENOL	ug/l	ND	ND	ND	ND	ND	NS	ND

WELL NUMBER M-1

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
BASE/NEUTRALS									
	N-NITROSODIMETHYLAMINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	BIS(2-CHLOROETHYL)ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROISOPROPYL)EYHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODI-N-PROPYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NITROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ISOPHORONE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROETHOXY)METHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2,4-TRICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	ug/l	<5.0000	<5.0000	ND	ND	ND	ND	ND
	HEXACHLOROBUTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROCYCLOPENTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLORONAPHTHALENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIMETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,6-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHENE	ug/l	ND	84.0000	ND	ND	ND	ND	ND
	2,4-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORENE	ug/l	ND	<5.0000	ND	ND	ND	ND	ND
	DIETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLOROPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODIPHENYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DIPHENYLHYDRAZINE	ug/l	ND	ND	ND	ND	ND	NS	ND
	4-BROMOPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	ug/l	ND	13.0000	ND	ND	ND	ND	ND
	ANTHRACENE	ug/l	ND	ND	10.3000	ND	ND	ND	ND
	DI-N-BUTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	ug/l	<5.0000	ND	21.0000	ND	ND	NS	ND
	BENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	NS
	PYRENE	ug/l	<5.0000	9.5000	11.0000	ND	ND	ND	ND
	BUTYL BENZYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)ANTHRACENE	ug/l	<10.0000	14.0000	<10.0000	ND	ND	ND	ND
	CHRYSENE	ug/l	<10.0000	ND	<10.0000	ND	ND	ND	ND
	3,3'-DICHLOROBENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	<5.0000	6.7000	ND	<5.0000	ND	ND	ND
	DI-N-OCTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(B)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(K)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	INDENO(1,2,3-C,D)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIBENZO(A,H)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(G,H,I)PERYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,3,7,8-TETRACHLORODIBENZO-P-D	ug/l	ND	ND	ND	ND	ND	NS	ND

WELL NUMBER W-2

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
BASE/NEUTRALS									
	N-NITROSODIMETHYLAMINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	BIS(2-CHLOROETHYL)ETHER	ug/l	ND	33.0000	ND	ND	ND	ND	15.0000
	1,3-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROISOPROPYL)EYHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROETHANE	ug/l	ND	ND	ND	83.0000	ND	ND	ND
	N-NITROSODI-N-PROPYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NITROBENZENE	ug/l	90.0000	ND	ND	ND	ND	ND	ND
	ISOPHORONE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROETHOXY)METHANE	ug/l	15.0000	ND	ND	ND	ND	ND	ND
	1,2,4-TRICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	ug/l	ND	116.0000	497.0000	420.0000	339.0000	64.0000	1180.0000
	HEXACHLOROBUTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROCYCLOPENTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLORONAPHTHALENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	ug/l	ND	32.0000	56.0000	22.0000	ND	<7.0000	13.0000
	DIMETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,6-DINITROTOLUENE	ug/l	ND	ND	ND	ND	10.6000	ND	ND
	ACENAPHTHENE	ug/l	ND	76.0000	15.0000	8.0000	ND	ND	11.0000
	2,4-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORENE	ug/l	ND	58.0000	120.0000	45.0000	ND	29.0000	35.0000
	DIETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLOROPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODIPHENYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DIPHENYLHYDRAZINE	ug/l	ND	ND	ND	ND	ND	NS	ND
	4-BROMOPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	ug/l	ND	14.0000	347.0000	36.0000	ND	93.0000	91.0000
	ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	12 0000
	DI-N-BUTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	ug/l	ND	ND	191.0000	12.0000	ND	31.0000	28.0000
	BENZIDINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	PYRENE	ug/l	ND	6.5000	126.0000	9.0000	ND	20.0000	19.0000
	BUTYL BENZYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)ANTHRACENE	ug/l	ND	25.0000	ND	ND	ND	ND	ND
	CHRYSENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	3,3'-DICHLOROBENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	ND	ND	ND	<5.0000	ND	ND	ND
	DI-N-OCTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(B)FLUORANTHENE	ug/l	ND	ND	<32.0000	<25.0000	ND	ND	ND
	BENZO(K)FLUORANTHENE	ug/l	ND	ND	<32.0000	ND	ND	ND	ND
	BENZO(A)PYRENE	ug/l	ND	ND	96.0000	<25.0000	ND	ND	ND
	INDENO(1,2,3-C,D)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIBENZO(A,H)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(G,H,I)PERYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,3,7,8-TETRACHLORODIBENZO-P-D	ug/l	ND	ND	ND	ND	ND	NS	ND

WELL NUMBER M-3

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
BASE/NEUTRALS									
	N-NITROSODIMETHYLAMINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	BIS(2-CHLOROETHYL)ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROISOPROPYL)EYHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODI-N-PROPYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NITROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ISOPHORONE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROETHOXY)METHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2,4-TRICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROBUTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROCYCLOPENTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLORONAPHTHALENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIMETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,6-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLOROPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODIPHENYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DIPHENYLHYDRAZINE	ug/l	ND	ND	ND	ND	ND	NS	ND
	4-BROMOPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DI-N-BUTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	NS	ND
	BENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	NS
	PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BUTYL BENZYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	CHRYSENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	3,3'-DICHLOROBENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	12.0000	ND	ND	<5.0000	ND	ND	ND
	DI-N-OCTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(B)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(K)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	INDENO(1,2,3-C,D)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIBENZO(A,H)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(G,H,I)PERYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,3,7,8-TETRACHLORODIBENZO-P-D	ug/l	ND	ND	ND	ND	ND	NS	ND

WELL NUMBER M-4

CATEGORY	PARAMETER	UNITS	DATE 04/10/85 CONCENTRATION	DATE 06/26/85 CONCENTRATION	DATE 10/15/85 CONCENTRATION	DATE 01/23/86 CONCENTRATION	DATE 04/24/86 CONCENTRATION	DATE 07/29/86 CONCENTRATION	DATE 10/10/86 CONCENTRATION
BASE/NEUTRALS									
	N-NITROSODIMETHYLAMINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	BIS(2-CHLOROETHYL)ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROISOPROPYL)EYHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROETHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODI-N-PROPYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NITROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ISOPHORONE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-CHLOROETHOXY)METHANE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2,4-TRICHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	ug/l	<5.0000	ND	ND	ND	ND	ND	ND
	HEXACHLOROBUTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROCYCLOPENTADIENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2-CHLORONAPHTHALENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIMETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,6-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,4-DINITROTOLUENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIETHYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	4-CHLOROPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	N-NITROSODIPHENYLAMINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	1,2-DIPHENYLHYDRAZINE	ug/l	ND	ND	ND	ND	ND	NS	ND
	4-BROMOPHENYL PHENYL ETHER	ug/l	ND	ND	ND	ND	ND	ND	ND
	HEXACHLOROBENZENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	ug/l	<5.0000	ND	ND	ND	ND	ND	ND
	ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DI-N-BUTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	ug/l	<5.0000	ND	ND	ND	ND	ND	ND
	BENZIDINE	ug/l	ND	ND	ND	ND	ND	NS	NS
	PYRENE	ug/l	<5.0000	ND	ND	ND	ND	ND	ND
	BUTYL BENZYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	CHRYSENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	3,3'-DICHLOROBENZIDINE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	8.5000	5.8000	<5.0000	<5.0000	ND	ND	ND
	DI-N-OCTYL PHTHALATE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(B)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(K)FLUORANTHENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(A)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	INDENO(1,2,3-C,D)PYRENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	DIBENZO(A,H)ANTHRACENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	BENZO(G,H,I)PERYLENE	ug/l	ND	ND	ND	ND	ND	ND	ND
	2,3,7,8-TETRACHLORODIBENZO-P-D	ug/l	ND	ND	ND	ND	ND	NS	ND

APPENDIX B

MONITORING WELL LOGS

LOG of BORING No. W-1

DATE 3/25/85 SURFACE ELEVATION 8.7 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS PPM SOILS
0		15						2
		28	Black Fill. Brick, cinders, coal, medium to coarse sand, trace wood					10
5		8		2.2				ND
		6	Dark black to gray, medium to fine sand	-0.3				<1
		4						58
10		3	Very soft, gray to black clay, some silt, trace peat					290
		5		-5.3				570
15								
20								

Completion Depth 14 Feet Water Depth 3.5 Feet Date 3/25/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

LOG of BORING No. W-2

DATE 3/26/85 SURFACE ELEVATION 13.4 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS SOILS PPM
0		30	Black Fill. Brick, cinders, and coal. Trace fine gravel. Bad odor					80
		17						20
5		13						100
		14						ND
		3						ND
10		1		3.4				40
		WOH	Very soft, black clay, trace silt. Bad odor	-0.6				60
15								
20								

Completion Depth 14 Feet Water Depth 2.5-3 Feet Date 3/26/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

LOG of BORING No. W-3

DATE 3/26/85 SURFACE ELEVATION 11.5 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER PPM TESTS SOILS
0		7						ND
		4	Black Fill. Coal, slag, very loose					ND
5		2						<1
		2		4.5				ND
		4	Very soft, black clay, trace silt, mica, and peat. Bad odor					18
10		2						880
		2	Very soft, gray to black, clayey silt, trace mica					>1000
				-2.5				220
15								
20								

Completion Depth 14 Feet Water Depth 3.5 Feet Date 3/26/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

LOG of BORING No. W-4

DATE 3/25/85 SURFACE ELEVATION 13.2 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER PPM TESTS SOILS
0		19	Brown to black, medium to fine sand, trace coarse sand, cement. (Fill) Trace clay at 2.5'					<1
		13						ND
5		14	Small coal pocket at 5.5'					ND
		3						<1
		5		4.2				350
10		21	Very soft, brown clay, trace sand, trace peat and shells	2.2				520
		13	Dark gray, medium sand, some gravel and clay	-1.3				520 680 220
15		9	Soft brown clay, trace sand	-2.8				160
20								

Completion Depth 16 Feet Water Depth 6 Feet Date 3/25/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

LOG of BORING No. W-5

DATE 10/15/86 SURFACE ELEVATION 12.80 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		12	Black medium to fine SAND, some silt, little slag, moist, medium dense					0
		5	-little clay					1
5		10	-coarse to medium sand, some fine gravel					0
		10	-saturated					0
		7	-gray to brown fine sand and silt little clay	2.80				2
10		1	Medium brown to gray SILT, some clay					0
		4	-gray clay, little silt, soft					16
15		4		-3.2				1
20								

Completion Depth 16 Feet Water Depth 6.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

Woodward-Clyde Consultants

LOG of BORING No. W-6

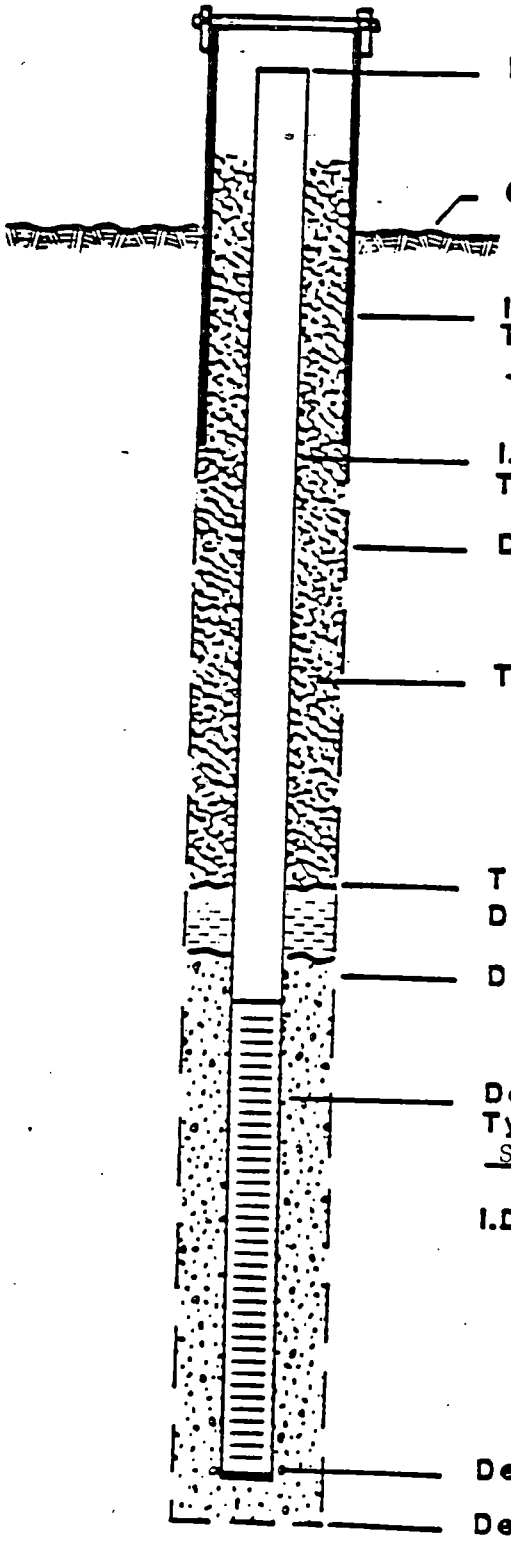
DATE 10/15/86 SURFACE ELEVATION 12.90 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		36	Black to brown FILL, some medium to fine sand and gravel, little silt, dry very					198
		45	dense					59
5		8	-black to gray coarse to medium sand, saturated, loose					180
		12	-black and brown mottled coarse to medium sand, some gravel, little silt					20
		10		3.40				16
10		4	Gray SILT, some clay, soft					12
		3	-dark gray clay, trace silt, little peat, silt partings, soft	-1.10				14
15								
20								

Completion Depth 14 Feet Water Depth 5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant Philadelphia, PA Project Number 84C2145-A

Woodward-Clyde Consultants

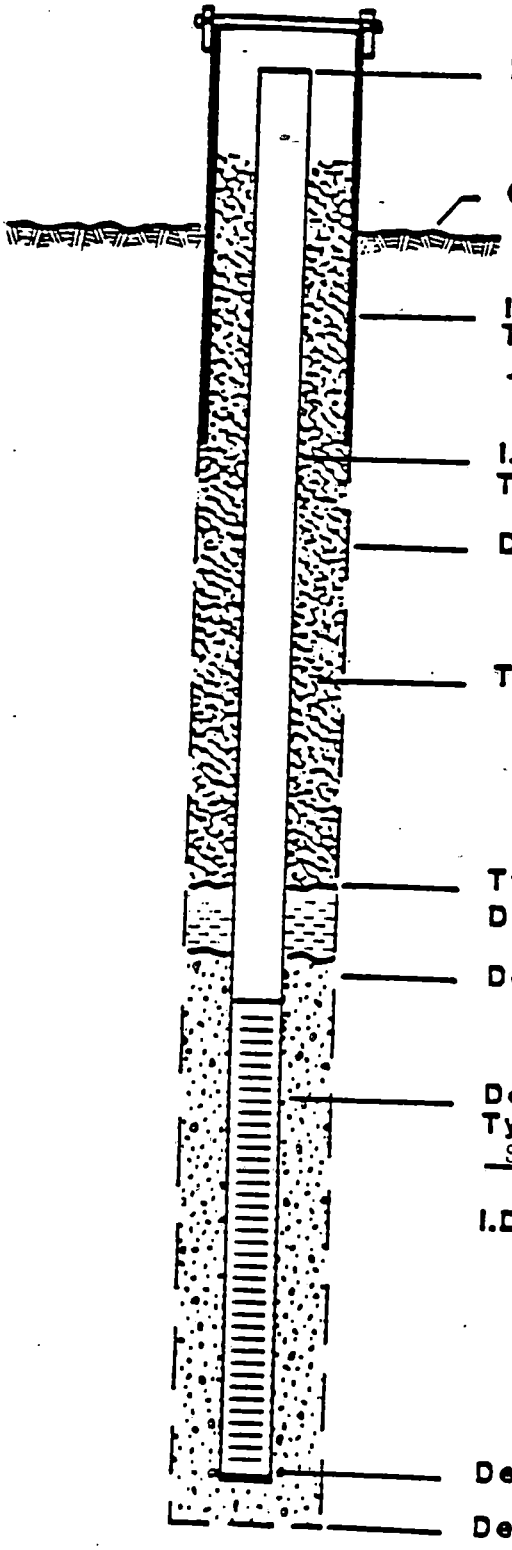


Elevation of top of riser pipe	10.94'
Ground Elevation	8.7'
I.D. of surface casing	6"
Type of surface casing	Steel with locking cap
I.D. of riser pipe	4"
Type of riser pipe	PVC
Diameter of borehole	12"
Type of backfill	cement
Type of seal	Bentonite Pellets
Depth to top of seal	1.0'
Depth to top of sand pack	2.0'
Depth to top of screen	3.0'
Type of screened section	SCH 40 20 slot PVC
I.D. of screened section	4"
Depth to bottom of well	13.0'
Depth of borehole	14.0'

REPORT OF MONITORING WELL W-1

DRAWN BY:	CHECKED BY:	PROJECT NO:	DATE	FIGURE NO:
TWT	PRJ	84C2145	3/25/85	

Woodward-Clyde Consultants



Elevation of top of riser pipe 15.31'

Ground Elevation 13.4'

I.D. of surface casing 6"
Type of surface casing Steel with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 1.0'

Depth to top of sand pack 2.0'

Depth to top of screen 3.0'
Type of screened section SCH 40 20 slot PVC

I.D. of screened section 4"

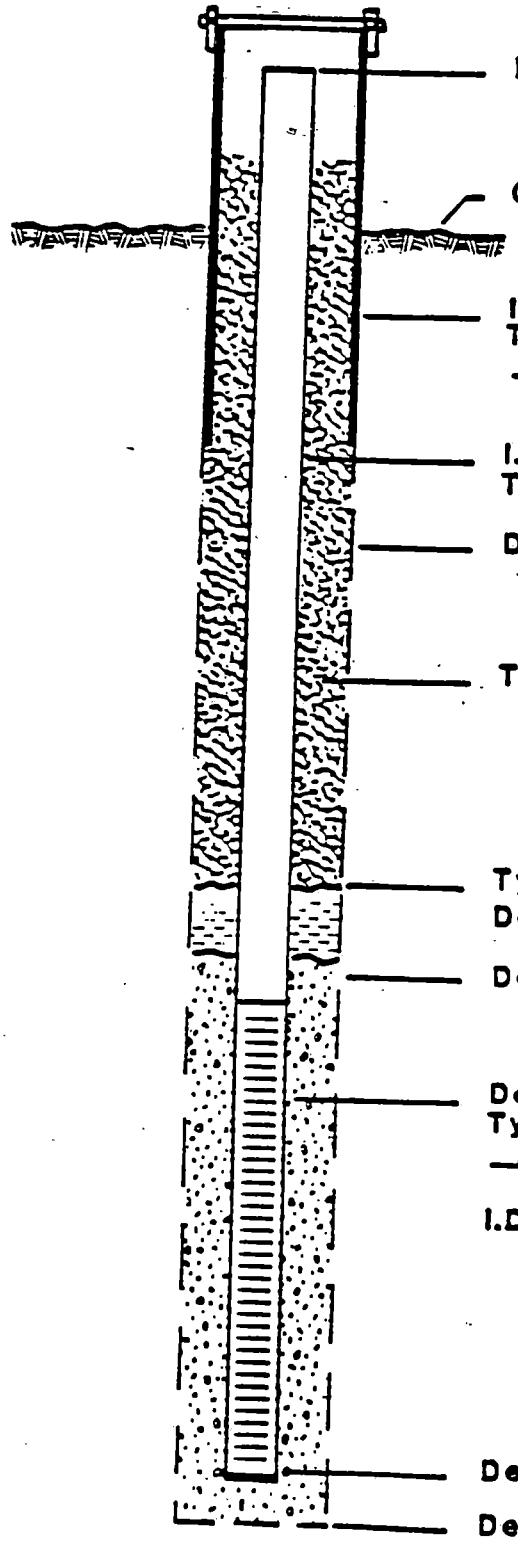
Depth to bottom of well 13.0'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-2

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/26/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 14.46'

Ground Elevation 11.5'

I.D. of surface casing 6"
Type of surface casing Steel with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 1.0'

Depth to top of sand pack 2.0'

Depth to top of screen 2.5'
Type of screened section SCH 40 20 slot PVC

I.D. of screened section 4"

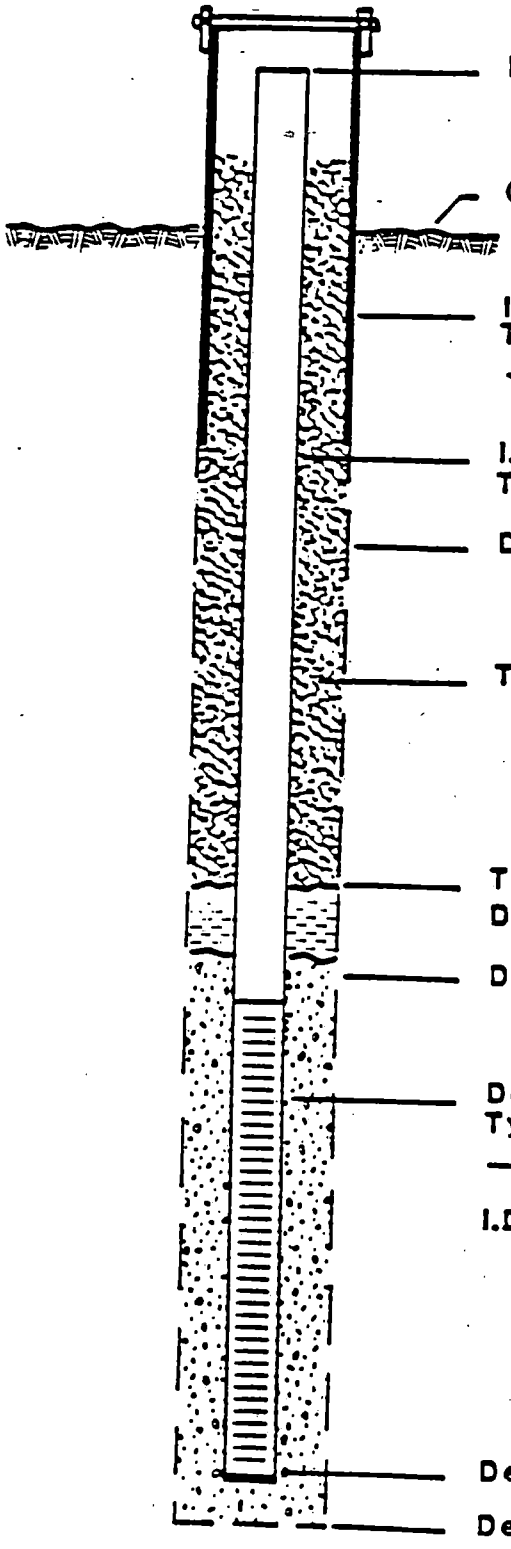
Depth to bottom of well 12.5'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-3

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/26/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 15.17'

Ground Elevation 13.2'

I.D. of surface casing 6"
Type of surface casing Steel with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 2.0'

Depth to top of sand pack 3.0'

Depth to top of screen 4.0'
Type of screened section SCH 40 20 slot PVC

I.D. of screened section 4"

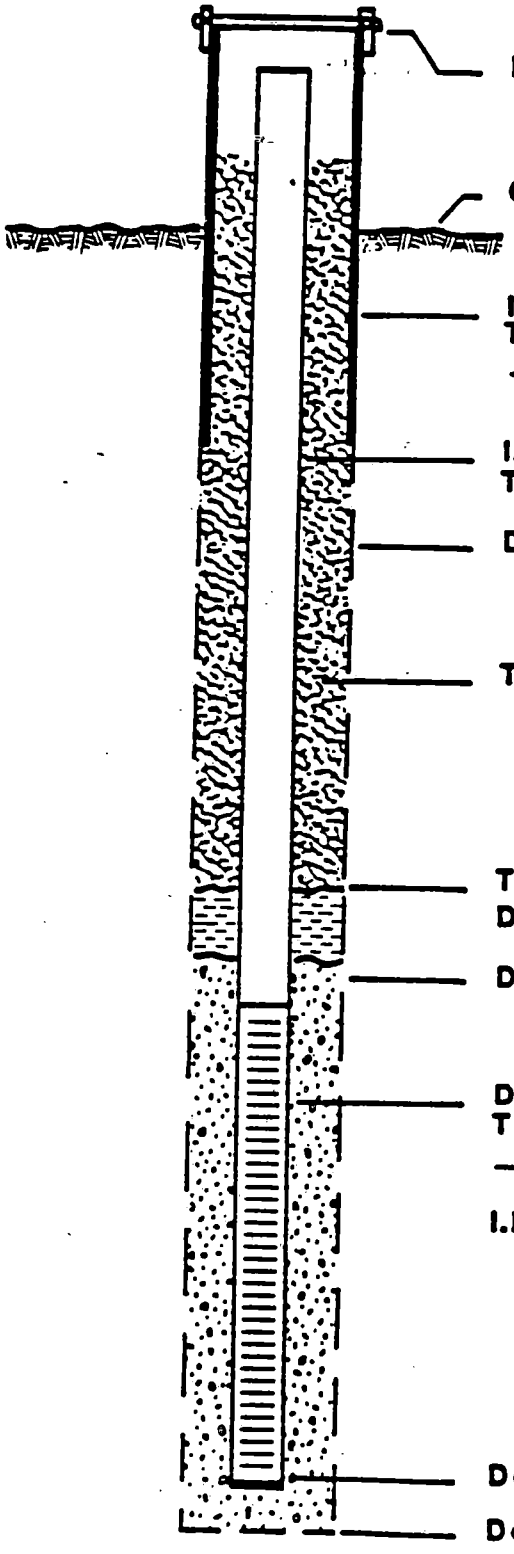
Depth to bottom of well 14.0'

Depth of borehole 16.0'

REPORT OF MONITORING WELL W-4

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/25/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 14.76

Ground Elevation 12.80

I.D. of surface casing 4"
Type of surface casing steel
with locking cap

I.D. of riser pipe 2"
Type of riser pipe PVC

Diameter of borehole 8"

Type of backfill cement

Type of seal Bentonite Pellets
Depth to top of seal 2.5'

Depth to top of sand pack 3.0'

Depth to top of screen 4.0'
Type of screened section
SCH 40 10 slot PVC

I.D. of screened section 2"

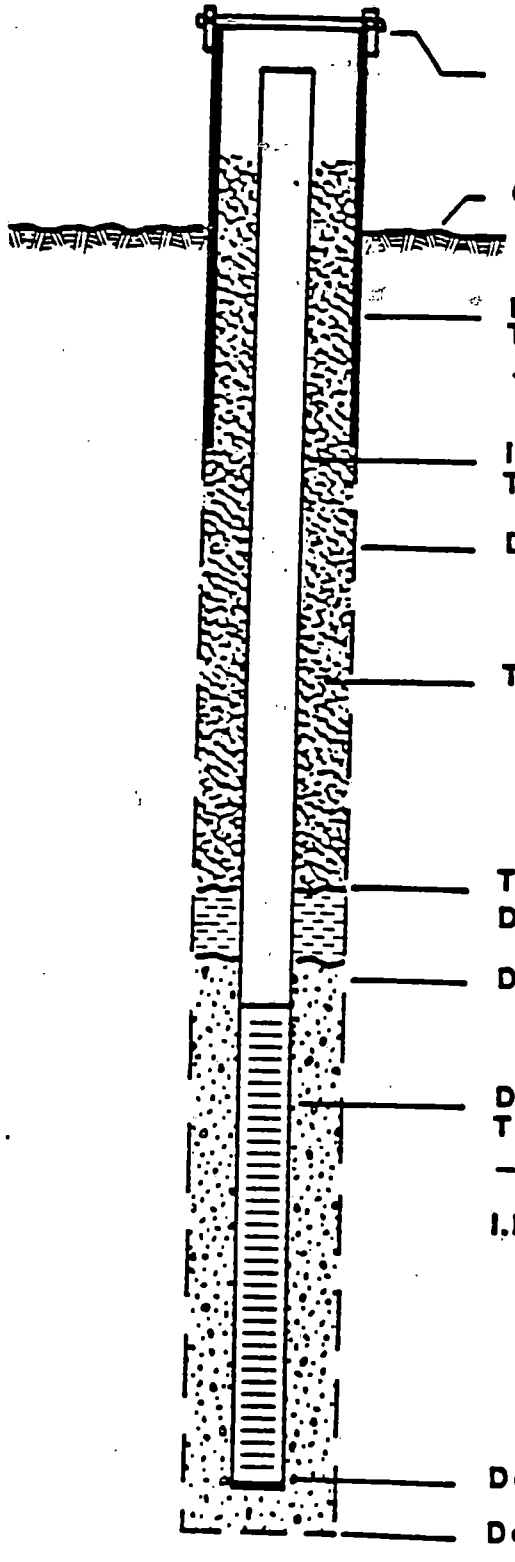
Depth to bottom of well 14.0'

Depth of borehole 16.0'

REPORT OF MONITORING WELL W-5

DRAWN BY: TP	CHECKED BY: RG	PROJECT NO: 84C2145-A	DATE: 10/23/86	FIGURE NO

Woodward-Clyde Consultants



Elevation of top of riser pipe 14.50

Ground Elevation 12.90

I.D. of surface casing 4"
Type of surface casing steel
with locking cap

I.D. of riser pipe 2"
Type of riser pipe PVC

Diameter of borehole 8"

Type of backfill cement

Type of seal Bentonite Pellets
Depth to top of seal 2.5'

Depth to top of sand pack 3.0'

Depth to top of screen 4.0'
Type of screened section
SCH 40 10 slot PVC

I.D. of screened section 2"

Depth to bottom of well 14.0'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-6

DRAWN BY: TP	CHECKED BY: RG	PROJECT NO: 84C2145-A	DATE: 10/23/86	FIGURE NO

Woodward-Clyde Consultants

APPENDIX C

BORING LOGS

APPENDIX C

BORING LOGS

LOG of BORING No. B-1

DATE 10/15/86 SURFACE ELEVATION 14.18 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		29	Black coarse to fine SAND with some slag, brick fragments, little gravel,					31
		47	dry, dense					36
			- very dense					
5		7	- some coal, concrete fragments, saturated, strong odor, oily sheen, loose					60
		15						37
			(FILL)	5.18				
		10						
10		3	Dark gray CLAY, some silt, very soft	2.18				
15								

Completion Depth 12 Feet Water Depth 4.3 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

LOG of BORING No. B-2

DATE 10/15/86 SURFACE ELEVATION 13.92 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		32	Black FILL, with coal, slag and brick fragments, some gravel, little silt and					15
		50	sand, dry, dense					14
5		15	- with coarse to medium sand, moist, medium dense					27
		15	- saturated, bottom 3" silt some clay, oily sheen	5.92				
		4	Light and dark gray laminated SILT and CLAY, increasing clay with depth					32
10		2	- medium gray clay, some silty partings	1.92				
15								

Completion Depth 12' Feet Water Depth 6.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

WCC - HP 1

Woodward-Clyde Consultants

LOG of BORING No. B-3

DATE 10/16/86 SURFACE ELEVATION 13.24 LOCATION See Plate 2

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		Concrete	12.24				
	16	Black coarse to fine SAND, some silt, some coal and rock fragments, dry, medium dense					1
	29	-moist					1
5			7.24				
	8	Medium to dark gray SILT with some clay, soft, saturated					
	4	-increasing clay content with depth	4.24				
10							
15							

Completion Depth 9 Feet Water Depth 6 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

Woodward-Clyde Consultants

LOG of BORING No. B-4

DATE 10/16/86 SURFACE ELEVATION 15.70 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		48	Black coarse to medium SAND, coal, cement fragments, some silt, dry, very dense -concrete 20 - 32"	11.70				*
5		1	Dark gray to black fine SAND with some silt very soft (2" recovery)					
		3	-saturated					
		2		6.20				
10		0	Dark to medium gray CLAY with some silt, very soft	3.70				
15			* HNU readings not taken					

Completion Depth 12 Feet Water Depth 6.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

WCC - RP 1

LOG of BORING No. B-5

DATE 10/16/86 SURFACE ELEVATION 14.20 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		7	Dark gray to black SAND, some silt, brick and coal fragments, dry, loose					*
		6	-increasing coarse sand					
5		10	-dark gray to brown medium to fine sand					
		13	-with some gravel, trace clay, saturated strong odor					
		6	-black sand, some silt, oily sheen					
10		3		3.20				
			Viscous, Tar-like material	1.70				
		1	Dark to medium gray CLAY with some silt	0.20				
15			* HNU readings not taken					

Completion Depth 14 Feet Water Depth 5.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

Woodward-Clyde Consultants

WCC - HP 1

LOG of BORING No. B-6

DATE 10/16/86 SURFACE ELEVATION 13.50 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0			Brown coarse to medium SAND, coal fragments, some silt					*
			CONCRETE	11.00				
		26	Brown to dark gray coarse to medium SAND, some silt and coal fragments, dry, dense					
5		10	-saturated, oily sheen, strong odor					
		6		5.50				
		5	Dark to medium gray SILT, some clay -increasing CLAY content	3.50				
10								
			* HNU readings not taken					
15								

Completion Depth 10 Feet Water Depth 4.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

WCC - HP 1

Woodward-Clyde Consultants

LOG of BORING No. B-7

DATE 10/16/86 SURFACE ELEVATION 14.20 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		33	Brown and gray mottled coarse to medium SAND some gravel, trace clay, concrete fragments dry, very dense					*
		16	-with little coal fragments, moist strong odor					
5		8	-with slag fragments, saturated, strong odor					
		8	-some black to dark gray silt	5.20				
		4	Medium to dark gray laminated SILT with some clay	3.20				
10		3	Black CLAY some silt	2.20				
			* HNU readings not taken					
15								

Completion Depth 12 Feet Water Depth 5.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

LOG of BORING No. B-8

DATE 10/17/86 SURFACE ELEVATION 14.20 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		28	Light brown coarse to medium SAND, some silt, little gravel					2
		24	-black to dark gray sand, with some brick, coal, and concrete fragments very dense, dry					2
5		37	-some wood fragments, moist					70
		8	-saturated, oily sheen, bad odor					
		1		5.20				
10		WOH	Dark gray to black SILT and CLAY, very soft	2.20				
15								

Completion Depth 12 Feet Water Depth 6.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

Woodward-Clyde Consultants

WCC - HP 1

LOG of BORING No. B-9

DATE 10/17/86 SURFACE ELEVATION 12.80 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	HNU SOIL (ppm)
0		22	Black and brown coarse to fine SAND, some brick and slag fragments, dry, dense					3
		5						11
5		8	-16" layer white to light gray coarse to medium sand sized material, cemented (lime)					4
		10	-black to dark gray medium to fine sand saturated					
		5						
10			-Black medium to fine sand and silt very strong odor	2.80				
15								

Completion Depth 10 Feet Water Depth 5.5 Feet Date 10/20/86

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145-A

APPENDIX D

SITE PHOTOGRAPHS

APPENDIX D

SITE PHOTOGRAPHS

Photo No. 1

Date: 5-13-87 Time: 2:50 Picture Taken By: JRD
Direction Facing: Northwest
Picture Description: Surface impoundment (Earthern Bottom)

Photo No. 2

Date: 5-13-87 Time: 2:55 Picture Taken By: JRD
Direction Facing: Northwest
Picture Description: Concrete-lined surface impoundments.

Photo No. 3

Date: 5-13-87 Time: 2:25 Picture Taken By: JRD
Direction Facing: Southeast
Picture Description: Waste Liquor Pit

Photo No. 4

Date: 5-13-84 Time: 2:30 Picture Taken By: JRD
Direction Facing: Southeast
Picture Description: Iron Oxide Pile

Photo No. 5

Date: 5-13-87 Time: 2:36 Picture Taken By: JRD
Direction Facing: Northeast
Picture Description: Tar Plains

Photo No. 6

Date: 5-13-87 Time: 2:45 Picture Taken By: JRD
Direction Facing: Northwest
Picture Description: 1,000,000 - Gallons Tar Storage Tank

Photo No. 7

Date: 5-13-87 Time: 2:46 Picture Taken By: JRD
Direction Facing: Northwest
Picture Description: 500,000 - Gallons Tar Storage Tank

Photo No. 8

Date: 5-13-87 Time: 2:38 Picture Taken By: JRD
Direction Facing: Northeast
Picture Description: Lime Pit Area

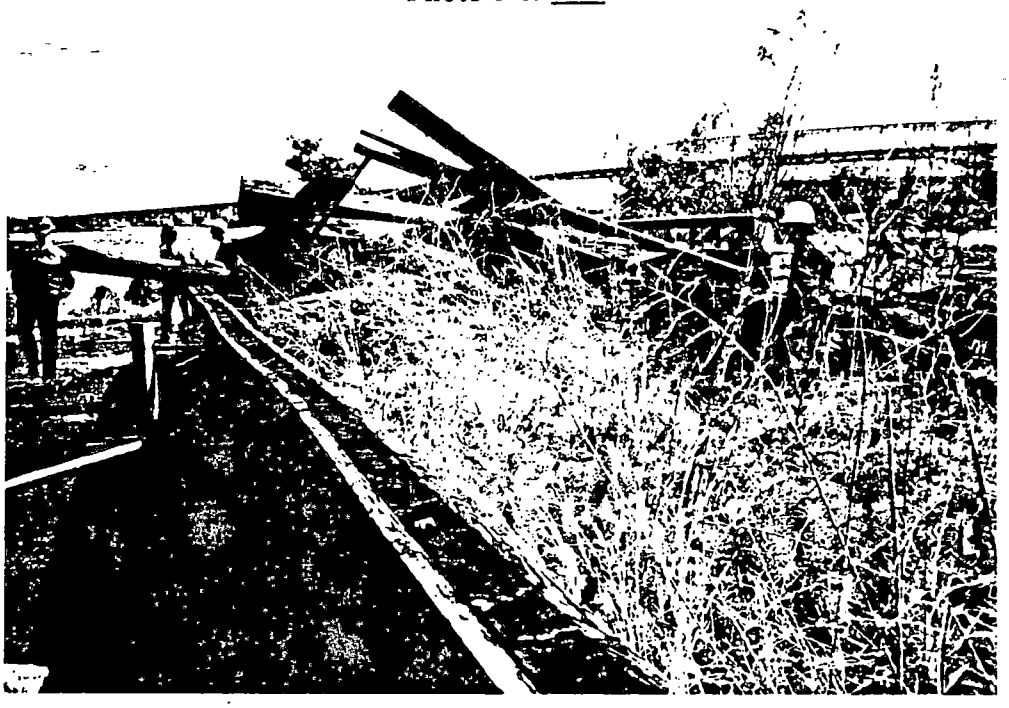
Photo No. 9

Date: 5-13-87 Time: 2:15 Picture Taken By: JRD
Direction Facing: Northwest
Picture Description: Asbestos Storage Area

Photo No. 10

Date: 5-13-87 Time: 2:38 Picture Taken By: JRD
Direction Facing: East
Picture Description: Trash Pile

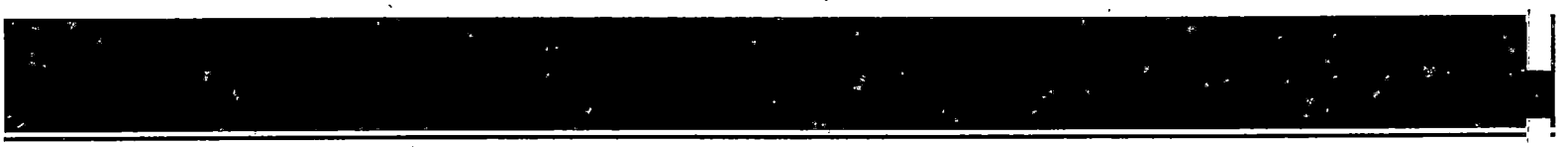
Photo No. 11



Date: 5-13-87 Time: 3:05 Picture Taken By: JRD
Direction Facing: Southeast
Picture Description: Oil/Water Separator

Photo No. __

Date:_____ Time:_____ Picture Taken By:_____
Direction Facing:_____
Picture Description:_____



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